COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN

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I hereby declare that the thesis entitled **"COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN"** submitted towards partial fulfillment of the requirements for the award of **MD** in **PEDIATRICS** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. SIDDHARTH BHARGAVA**, Associate Professor, Department of Pediatrics, **DR. PUNEET A POONI,** Professor and Head, Department of Pediatrics & **DR. G.S.DHOORIA**, Professor, Department of Pediatrics. No part of this thesis has formed the basis for the award of any degree previously.

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Dedicated

to

My Family,

Friends

&

Teachers

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ABBREVATIONS

ABG	Arterial Blood Gas
AGE	Acute Gastroenteritis
AKI	Acute Kidney Injury
ATLS	Advanced Trauma Life Support
CKD	Chronic Kidney Disease
DKA	Diabetic Ketoacidosis
DNS	Dextrose Normal Saline
FFP	Fresh Frozen Plasma
FINNAKI	Finnish Acute Kidney Injury
ICU	Intensive Care Unit
IQR	Inter Quartile Range
KDIGO	Kidney Disease: Improving Global Outcomes
MAKE30	Major Adverse Kidney Events within 30 days
NAGMA	Normal Anion Gap Metabolic Acidosis
NS	Normal Saline
PHIS	Pediatric Health Information System
PICU	Pediatric Intensive Care Unit
PL	Plasma-Lyte
PRISM	Pediatric RISk of Mortality
PRoMPT	PRagMatic Pediatric Trial
RL	Ringer Lactate
RRT	Renal Replacement Therapy
SD	Standard Deviation
SID	Strong Ion Difference
SMART	Solutions and Major Adverse Renal Events Trial
VIS	Vasoactive Inotropic Score

ABSTRACT

Introduction: Ideal fluid for pediatric resuscitation remains an area of debate in the wake of increasing concerns of hyperchloremic metabolic acidosis with the use of 0.9% saline. Plasma-Lyte being a chloride-restrictive fluid is expected to reduce occurrence of hyperchloremic acidosis. The present study has been done with the objective of evaluating Plasma-Lyte as an alternative to NS as a resuscitative fluid affecting patient outcome in critically ill children.

Aim of Study: To compare a balanced electrolyte solution with normal saline as resuscitation fluid in children

Materials & Methods: An open-label randomized control trial [CTRI/2021/04/033284] was done in a tertiary care hospital on children aged 1 month to 18 years who presented to the emergency and required fluid resuscitation within 6 hours of admission. Children were randomized to receive either a balanced electrolyte solution [Plasma-Lyte] or Normal saline as resuscitative fluid based on the computer generated by random number sequence. Change in serum bicarbonate at 24, 48 and 72 hours as compared to admission value was taken as primary outcome. Intent to treat (ITT) principle was used for statistical data analysis. Mann Whitney U test and Chi square ($\chi 2$) test was performed as appropriate.

Results: 80 children were enrolled (40 in each group). Median age was 7.17 (3-12) and 6 (1.3-11.75) years in the PL and NS groups respectively with male: female ratio of 1.3:1. Change in bicarbonate between two groups was insignificant at 24 (p-0.899), 48 (p-0.969) and 72 hours (p-0.814). The incidence of hyperchloremia, hypernatremia, new onset AKI, length of hospital stay and mortality was also comparable. A significant difference in patients needing inotropes (p-0.013) and duration of ventilation (p-0.013) was observed.

Conclusion: PL and NS were found similar with regard to occurrence of metabolic acidosis, hypernatremia, hyperchloremia and new onset AKI when used as resuscitation fluid during initial 72 hours in critically ill children.

Keywords: Children, Normal Saline, Plasma-Lyte, Resuscitation Fluid.

TABLE OF CONTENTS

S. NO.	TOPIC	PAGES
I	INTRODUCTION	1-4
II	AIMS AND OBJECTIVES	5
III	REVIEW OF LITERATURE	6-13
IV	MATERIALS AND METHODS	14-20
V	OBSERVATIONS AND RESULTS	21-48
VI	DISCUSSION	49-54
VII	SUMMARY AND CONCLUSIONS	55-56
VIII	BIBLIOGRAPHY	57-61
	APPENDICES – I - PROFORMA - MASTER CHART	
	APPENDICES – II - APPROVAL LETTER OF THESIS PLAN - THESIS PLAN	

LIST OF TABLES

Table No.	Title	Page No.
1.	Baseline characteristics of the study groups	37
2.	Baseline characteristics of the study groups (cont.)	38
3.	Change in Serum Bicarbonate at 24, 48 and 72 hours compared to Baseline	39
4.	Secondary outcome measures among the study groups	40
5.	Change in sodium at 24, 48 and 72 hours from Baseline	41
6.	Change in chloride at 24, 48 and 72 hours from Baseline	42
7.	Change in pH at 24, 48 and 72 Hours from Baseline	42
8.	Incidence of Normal Anion Gap Metabolic Acidosis at 24, 48 and 72 Hours from Baseline	43
9.	Incidence of new onset / progressive AKI at 72 hours from Baseline	44
10.	Need for inotropes in initial 72 hours of admission	45
11.	Patient outcome	48

LIST OF FIGURES

Fig. No.	Title	Page No.
1.	Study Flow Diagram	21
2.	Mean age distribution	22
3.	Box and Whisker plot for median age in two group	22
4.	Percentage distribution based on gender	23
5.	Box and Whisker plot for median Weight for Age	23
6.	Percentage distribution of Weight for Age (based on centiles)	24
7.	Box and Whisker plot for median Height for Age	24
8.	Percentage distribution of Height for Age (based on centiles)	25
9.	Number of patients in each group based on adequacy of oral intake	26
10.	Number of patients in each group based on adequacy of oral intake	26
11.	Percentage of patients in each group based on history of Vomiting	27
12.	Percentage of patients in each group based on status of Intravenous fluid administration prior to admission	27
13.	Percentage of patients in each group based on adequacy of Urine Output (as deemed by parents)	28
14.	Percentage of patients in each group based on history of Diarrhea	29
15.	Overall percentage distribution of patients based on cause for resuscitation	30
16.	Percentage distribution of patients in each group based on cause for resuscitation	30
17.	Distribution of patients in each group based on mean PRISM III Score at admission	31
18.	Box and Whisker plot for PRISM III Score at admission	31
19.	Box and Whisker plot for median Sodium (in mEq/kg) administered from sources other than resuscitation fluid	32
20.	Box and Whisker plot for median Chloride (in mEq/kg) administered from sources other than resuscitation fluid	33
21.	Box and Whisker plot for median Bicarbonate (in mEq/kg) administered from sources other than resuscitation fluid	33
22.	Mean Volume of resuscitation fluid administered in the two groups	34

23.	Percentage of patients requiring packed cell transfusion in each group	35
24.	Percentage of patients requiring fresh frozen plasma transfusion in each group	35
25.	Percentage of patients requiring Platelet transfusion in each group	36
26.	Percentage of patients requiring Albumin transfusion in each group	36
27.	Mean Change in Serum Bicarbonate from baseline at 24, 48 and 72 hours	39
28.	Mean Change in Serum Sodium from baseline at 24, 48 and 72 hours	41
29.	Mean Change in Serum Chloride from baseline at 24, 48 and 72 hours	42
30.	Mean Change in pH from baseline at 24, 48 and 72 hours	43
31.	Percentage distribution based on incidence on new onset/ progressive AKI	44
32.	Percentage distribution based on proportion of patients needing inotropes	45
33.	Box and Whisker plot for median Maximum Vasoactive Inotropic Score (VIS) within 72 hours from Baseline	46
34.	Mean distribution based on number of days of hospital stay	46
35.	Kaplan-Meier survival curve for the two groups	47

LIST OF PICTURES

Table No.	Title	Page No.
1.	Characteristics of common crystalloid solutions compared to human plasma	7
2.	Vasoactive Inotropic Score [VIS]	19

INTRODUCTION

Crystalloids are the most commonly utilised intravenous fluids in critically ill patients. Presently, there are a variety of crystalloids available for use in hospitals. These fluids are the first choice for resuscitation in the presence of hypovolemia, hemorrhage, dehydration or sepsis. Other clinical applications include acting as a solution for intravenous drug delivery, delivering maintenance fluid in patients with limited or no enteral nutrition. Also recent data suggest that crystalloids are a part of the initial resuscitation for 25 million children with septic shock worldwide every year [1].

Traditionally normal saline has been the most widely accepted and used fluid in adult and pediatric critical care. Since it is isotonic so, it helps to maintain serum osmolality and is more effective plasma volume expander as compared to hypotonic fluids. However, there is a growing concern regarding its safety as normal saline contains supraphysiological concentrations of chloride so, its administration has been associated with increased risk of hyperchloremia and its associated complications. When used in significant volumes, 0.9% saline leads to a foreseeable hyperchloremic metabolic acidosis with associated hyperchloremia-induced renal afferent arteriole constriction, which can cause a decrease in the glomerular filtration rate [2]. While there is an ongoing debate on the exact mechanism of development of metabolic acidosis, the thinking is that the increase in chloride concentration adjusts the strong ion difference in plasma, resulting in more free water in the intravascular space. As a result, the hydrogen ion concentration in the serum would increase to maintain electrochemical neutrality with resultant increased bicarbonate excretion by kidneys leading to metabolic acidosis. Also, these have an influence on hemostasis and blood transfusion requirements. Animal and experimental data have reported that 0.9% saline may be associated with altered renal perfusion, reduced glomerular filtration and may affect the release of proinflammatory cytokines [2]. Few

observational studies report that the use of high chloride containing fluid might be associated with AKI and an increased need for renal replacement therapy. However, there is no significant evidence from prospective interventional research linking the use of unbuffered crystalloid fluid and impaired renal function.

There is an emerging interest to classify and investigate the comparative effectiveness of crystalloid fluids based on buffered/balanced and unbuffered/unbalanced fluid types. There is evidence from observational studies to suggest that there is less need for blood products in patients who only received buffered fluids compared to those that received 0.9% saline [2]. Interventional studies have been largely conducted in surgical populations and there is evidence in high-risk subgroups of patients that the use of 0.9% saline may be associated with increased blood loss volume and increased requirement for platelets.

As critically ill children present a challenge of developing variable degrees of fluid and electrolyte imbalances; so, there has been a lot of debate around the ideal resuscitation fluid for use in different clinical entities like septic shock and DKA [3]. Some reports have hypothesized a causal link between hyperchloremia and acute kidney injury (AKI) [4-5]. Preliminary studies undertaken by different workers have provided evidence to support Plasma-Lyte being superior to NS. In a single-centre, prospective, open-label, pilot study done on 1500 critically ill patients, the implementation of a chloride-restrictive strategy that included avoiding NS was associated with a significant decrease in the incidence of acute kidney injury (AKI) and the need for renal replacement therapy (RRT) [6]. Extended analysis of almost 3000 patients done over 1-year period revealed an overall beneficial impact on AKI of restricting chloride-rich fluids. Similar studies have been done in children, however, these studies have been done on specific entities *per se* and were undertaken using small sample sizes necessitating the need for a larger and more generalized study for elucidating the advantages offered by Plasma-Lyte

viz-á-viz the conventionally used NS. Plasma-Lyte has been found to produce lower increases in chloride in diabetic ketoacidosis resuscitation, with quicker resolution of acidosis than occurs with saline [7].

Balanced fluids were developed with the goal of being more physiologic with a composition closer to that of serum, hence reducing the risk as well as incidence of hyperchloremic metabolic acidosis [8]. Various formulations are being studied and marketed with Ringer's lactate (RL) being the most commonly used balanced solution and Plasma-Lyte being one of the most researched fluid owing to its chloride restricted composition. Also, Plasma-Lyte has acetate as its organic anion which confers several advantages over lactate-containing crystalloids; one being that unlike lactate metabolism, acetate metabolism is not entirely dependent on hepatic function and is preserved in severe shock. Acetate is metabolised more rapidly than lactate, is more alkalinizing than lactate generating bicarbonate within 15 min after its administration [9-10]. This property confers benefit in treating patients who are acidemic and require fluid intervention or resuscitation. Being free of lactate; Plasma-Lyte does not create alterations in lactate which is an important prognosticating marker while managing shock patient.

Balanced salt solutions have been associated with better outcomes when compared to normal saline, including decrease in acute kidney injury (AKI), need for renal replacement therapies (RRT), and death in a pediatric study, while others reported no benefit or detrimental effect [11-13]. The Isotonic Solutions and Major Adverse Renal Events Trial (SMART) found a small, yet significant, reduction in major adverse kidney events within 30 days (MAKE30) with the use of Balanced salt solutions compared to normal saline in critically ill adults [14]. Recent guidelines revealed a weak suggestion for Balanced salt solutions while suggesting further studies for comparing the effectiveness of different types of fluid in pediatric septic shock [15].

Since the evidence from current studies has been conflicting with regard to the advantage of balanced solution over unbalanced crystalloids. The present study has been done with the objective of evaluating Plasma-Lyte as an alternative to NS as a resuscitative fluid affecting patient outcome in critically ill children. The outcomes studied are change in serum bicarbonate serum chloride, serum sodium, pH, Base excess, serum lactate from baseline [at admission] when compared to values at 24 and 72 hours and its peak/worst value, incidence of normal anion gap metabolic acidosis, acute kidney injury at 72 hours (using KDIGO criteria) and efficacy measures like impact on ionotropic score, proportion of in-hospital all-cause mortality and length of ICU stay when a balanced solution [Plasma-Lyte] is compared with an unbalanced electrolyte solution [NS] as a resuscitative fluid in children.

AIMS AND OBJECTIVES

To compare a balanced electrolyte solution with normal saline as resuscitation fluid in children presenting to pediatric emergency.

1. Primary outcome: To assess Change in serum bicarbonate at 24, 48 and 72 hours of resuscitation with either Plasma-Lyte or Normal saline as resuscitation fluid.
2. Secondary outcomes: Incidence of normal anion gap metabolic acidosis, change in serum electrolytes (sodium and chloride), acid-base balance, new onset or progressive AKI at 72 hours (using KDIGO criteria) and efficacy measures like impact on ionotropic score, proportion of in-hospital all-cause mortality and length of ICU stay.

REVIEW OF LITERATURE

Globally, there are variations in the resuscitative intravenous fluids used for treatment of clinically ill patients. The type and choice depends primarily on local availability, marketing and cost of fluid [13-14]. Recently there has been an increase interest in the comparative efficacy of different intravenous fluids when compared to use of 0.9% saline in critically ill patients [13, 15].

Crystalloid fluids are a heterogeneous group of aqueous solutions containing varying concentrations of inorganic ions and small organic molecules [16]. These have evolved since first being used during the cholera epidemic in the 1830s when Dr. Thomas Latta infused a solution of water, sodium, chloride, and bicarbonate through a metal tube into the veins of patients dying from cholera [17]. In the ensuing years; various workers contributed to learning about fluid resuscitation strategies.

Dillon et al.[18] in 1966 supported a strategy of a 3:1 volume replacement with isotonic crystalloid. Infusion of large volume of crystalloids was thought to improve survival through replacement of both intravascular losses and building up interstitial volume. Animal data from the 1980s and 1990s showed increased incidence of a hyperchloremic metabolic acidosis and increased mortality with administration of large volumes of isotonic sodium chloride solution (NS) which led to the emergence of Ringer's lactate solution (RL) as the crystalloid fluid of choice for resuscitation in the post–Vietnam era [19-20]. In the later decades, the approach of utilizing RL was standardized through the Advanced Trauma Life Support (ATLS) guidelines [21]. RL was associated with side effects similar to other crystalloids along with the observation that it led to increased lactate which interfered with prognostication of sick patients. Gradually over the years, Plasma-Lyte a balanced crystalloid which was first patented in 1982, and commercially available for peri-operative fluid intervention for over 25 years in the United Kingdom, United States and other countries as well began to gain popularity [22]. The electrolyte

composition of PL 148 more closely reflects the constituents of human plasma compared with both Hartmann's Solution, RL and NS, and is hence considered a more "physiological" solution so, various studies have been conducted by different researchers for its safety, efficacy as a maintenance or resuscitation fluid in different clinical settings.

PICTURE 1: Characteristics of common crystalloid solutions compared to human plasma

	Plasma	**Normal saline**	**RL[a]**	**PL[b]**
Sodium (mmol/l)	136–145	154	130	140
Potassium (mmol/l)	3.5–5.0		4	5
Magnesium (mmol/l)	0.8–1.0			1.5
Calcium (mmol/l)	2.2–2.6		3	
Chloride (mmol/l)	98–106	154	109	98
Acetate (mmol/l)				27
Gluconate (mmol/l)				23
Lactate (mmol/l)			28	
Theoretical osmolarity (mosmol/l)	291	308	273	295
Actual/measured osmolality (mosmol/kg)	287	286	256	271
pH	7.35–7.45	4.5–7	5.0–7	4–8

[a] Ringer's lactate (lactate buffered solution)

[b] Plasma-Lyte 148® (acetate & gluconate buffered solution)

Modified from [2]: Reddy, S., Weinberg, L. & Young, P. Crystalloid fluid therapy. *Crit Care* **20**, 59 (2016).

Fluids are commonly classified on the basis of their main solute (e.g. sodium chloride, glucose, etc.) or tonicity compared to human plasma (isotonic, hypotonic, hypertonic). The variable electrolyte composition of

each crystalloid fluid contributes to the ability of infused fluid to stay within the intravascular space and resulting biological properties. An ideal fluid is the one that produces a predictable and sustained increase in intravascular volume. Crystalloids possess a chemical composition close to that of extracellular fluids and get completely metabolized and excreted. There has recently been a push to further distinguish fluids into physiologically buffered / balanced or physiologically unbuffered / unbalanced fluids [2].

Universally, crystalloid solutions are used for the resuscitation of critically ill patients in the intensive care unit. Among different crystalloids that are available (0.9% saline (NS), Ringer's Lactate (RL), and Plasma-Lyte) and commonly being used, NS has the advantage of being available in various combinations (N/2, N/3, N/5 and DNS with 5% dextrose). It is also cost-effective making it ideal for routine use. The most commonly used for resuscitation among the various crystalloid solutions is sodium chloride in the form of "normal saline" (NS). However, NS has some limitations; the most worrisome being hyperchloremic metabolic acidosis attributed to its high chloride content compared to normal plasma (95-110 mmol/L) [23-25].

Wakim [24] in 1970 gave 2 justifications to prove that 0.9% saline is erroneously known as 'normal saline'. He said that '' "Normal" 0.9% Salt Solution Is Neither "Normal" Nor Physiological'' One reason being its supraphysiologic chloride content and secondly owing to a low strong ion difference (SID) when compared to plasma. In 1999, Scheingraber et al. concluded that *Rapid Saline Infusion Produces Hyperchloremic Acidosis by virtue of* Stewart's physiochemical approach to acid-base balance [26]. Fluid pH is dependent on SID, which is the sum of strong cation concentrations in the solution (e.g. sodium, calcium, magnesium, potassium), minus the sum of strong anion concentrations in the solution (e.g. chloride, lactate). As the SID of extracellular fluid is 40 mEq/Litre approximately whereas that of 0.9% saline is zero so, following an infusion

of 0.9% saline there is a net decrease in plasma SID leading to hyperchloremic metabolic acidosis [26].

Yunos and co-authors [25] in a single-centre, prospective, open-label, sequential-period pilot study of about 1500 critically ill patients studied the overall impact of restricting chloride-rich fluids that included avoiding NS. They reported that the implementation of a chloride-restrictive strategy in a tertiary ICU was associated with a significant decrease in the incidence of AKI and use of RRT. The extended analysis of about 3000 patients over a 1-year period showed that the overall beneficial impact on AKI of restricting chloride-rich fluids remained [25].

Shaw et al. in 2014, through their study demonstrated an association between IV chloride load and mortality in hospitalized patients with SIRS, independent of total fluid volume. The balance of probabilities appeared to be shifting away from high-chloride toward low-chloride solutions for first-line fluid resuscitation of patients with SIRS [27].

In 2016, Marttinen et al [28] in the Finnish Acute Kidney Injury (FINNAKI) hypothesized that higher plasma Chloride is associated with an increased risk for the development of AKI. They analysed chloride values during the ICU stay of 445 patients. They showed higher time-weighted mean chloride levels that were independently associated with an increased risk of AKI. Based on the measured chloride values, 350 of 445 patients had hyperchloremia and 48 severe hyperchloremia. A total of 217 of 445 patients developed AKI. Hence, more than three out of four critically ill patients had hyperchloremia and 1 out of 10 had its severe form.

The origin of buffered/balanced crystalloids took place serendipitously in the 1880s, when Sydney Ringer, while investigating the influence of blood constituents on cardiac contractions, discovered that inorganic contaminants (namely calcium) added to a 0.75% saline solution through the use of pipe water, prolonged cardiac contractility in frog ventricles when compared to a saline solution prepared from distilled water [29]. Few decades later; Hartmann observed that use of alkaline therapy while

treating children with acidosis improved outcome. He added *sodium lactate to Ringer's solution* with the idea of combating acidosis in his young patients. This solution in 1930's began to be sold in America by the name Ringer Lactate and in Britain as Hartmann's solution although Hartmann himself never used this name [30].

Jadad et al. while assessing the quality of reports of randomized clinical trials: Is blinding necessary? Reported that in children with gastroenteritis those given Plasma-Lyte had statistically significant greater increases in serum bicarbonate from baseline than did the 0.9% NaCl group. Both treatment groups had received similar fluid volumes. The Plasma-Lyte group had a significantly better dehydration scores at 2 hr and a non-significant better score at 4 hr [31].

With the turn of the century; there was a renewed focus in use of lactate and acetate based crystalloids. Emrath et al. reviewed the data from the Pediatric Health Information System (PHIS) database from 2004 to 2012 to evaluate outcomes in patients receiving balanced fluids for resuscitation in pediatric severe sepsis [32]. Children receiving balanced fluids for resuscitation in the first 24 and 72 hours of treatment were compared to those receiving unbalanced fluids. A total of 36908 patients fulfilled the requirements criteria for analysis. 2398 patients received exclusively balanced fluids at 24 hours and 1,641 at 72 hours. After matching, the 72-hour balanced fluids group had lower mortality (12.5% vs 15.9%), lower prevalence of acute kidney injury (16.0% vs 19.2%) and fewer vasoactive infusion days (3 vs 3.3 days) when compared with the unbalanced fluids group. They concluded that exclusive use of balanced fluids in pediatric severe sepsis patients for the first 72 hours of resuscitation was associated with improved survival, decreased prevalence of acute kidney injury, and shorter duration of vasoactive infusions when compared with exclusive use of unbalanced fluids.

During the last decade, there has been a rising trend towards use and research over Plasma-Lyte in various clinical settings. Verma and co-

workers (2016) conducted a double blind, randomised controlled pilot study to assess the biochemical and physiological effects along with the feasibility and safety of resuscitation with NS versus Plasma-Lyte 148 in critically ill patients [33]. They took daily Base Excess as the primary outcome and incidence of AKI and various other parameters as secondary outcomes. The study concluded that PL-148 did not lead to a significant increase in Base Excess values in critically ill patients requiring fluid resuscitation, but decreased peak chloride concentrations.

During the same timeframe Allen et al. realised that there has been limited evidence exploring the effect of different crystalloid fluids on gastrointestinal function [34]. Animal studies have reported that the use of crystalloid fluids may be associated with impact on gastrointestinal system such as an acute hydrostatic gut oedema and slowing of intestinal transit time. Allen et al. in 2016 compared the efficacy and safety of Plasma-Lyte A (PLA) versus 0.9 % sodium chloride (NaCl) intravenous (IV) fluid replacement in children with moderate to severe dehydration secondary to acute gastroenteritis (AGE) and concluded that in comparison with 0.9 % NaCl, PLA for rehydration in children with AGE was well tolerated and led to more rapid improvement in serum bicarbonate and dehydration score.

A lot of debates have been around the ideal resuscitation fluid for use in septic shock and DKA. A study conducted by Edwards and Mason [35] in 2018 suggested that in children Plasma-Lyte is equivalent to or possible superior in some situations to alternative intravenous fluids.

A multicentric study initiated in 2017 by Jhuma Sankar et al [36]. Comparing Balanced Crystalloid versus Saline for initial resuscitation in Children with Septic Shock. They studied risk of AKI in the first 7 days after initial fluid resuscitation as their primary outcome. The study revealed a significant reduction in incidence of new onset acute kidney injury hereby concluding that balanced crystalloids should be preferred over unbalanced crystalloids for initial resuscitation in children [36].

Arya et al. In 2018 did a randomized control trial of Plasma-Lyte versus normal saline as resuscitation fluid in 400 children and studied its impact on acid–base balance, electrolytes, and lactate clearance at the end of 6 hours [37]. The study showed the advantage of using Plasma-Lyte result in in better acid–base profile as compared to normal saline group. Plasma-Lyte was superior to normal saline when used as a resuscitation fluid in children with shock, in terms of better improvement of acid-base balance and a lower rise in serum chloride level at 6 hours from baseline. The children who received Plasma-Lyte had a shorter hospital stay, lesser need for vasoactive drugs, and lower mortality. Williams et al. conducted a double-blind randomized controlled trial to compare normal saline with Plasma-Lyte-A as initial fluid in pediatric DKA [38]. The study was done in a tertiary care hospital in India from August 2017 to December 2018 in children with Diabetic Ketoacidosis aged 1 month to 12 years. He excluded children who had received pre-referral fluids and/or insulin or had cerebral edema or were known to have chronic renal/liver disease. Sixty-six children underwent randomization to receive either Plasma-Lyte (n = 34) or 0.9% saline (n = 32). In 2020 results concluded that the incidence of new or progressive acute kidney injury (AKI) and resolution of AKI were similar in both Plasma-Lyte and 0.9% Saline with respect to resolution of DKA need for RRT, mortality, and lengths of PICU and hospital stay. An anticipated 5 year study protocol initiated in August 2020; PRoMPT BOLUS [PRagMatic Pediatric Trial of Balanced vs nOrmaL Saline FlUid in Sepsis will provide high-quality evidence for the comparative effectiveness of balanced salt solutions versus normal saline for the initial fluid management of children with suspected septic shock in emergency settings [38]. As of now, there is insufficient evidence to support one crystalloid fluid type for pediatric shock resuscitation, which was acknowledged as a key knowledge gap by the 2020 Surviving Sepsis Campaign guidelines [16].

Lehr et al. concluded a systematic review and meta-analysis in 2022 suggesting an improved serum bicarbonate and blood pH values in critically ill children after fluid bolus therapy with balanced fluid when compared with unbalanced fluids although no clear benefits on clinical outcomes were demonstrated [8]. They also stated that “Although no recommendation can be generated at this point, our systematic review provides background information for further robust methodical studies on the choice of fluid bolus therapy in critically ill children.”

Studying resuscitation fluids and its impact becomes an essential area for research inputs as large amounts of intravenous fluids are administered over minutes to few hours of hospitalization and can cause hypervolemia and potentially electrolyte imbalance.

Conceptually, balanced fluids are expected to fare better than unbalanced fluids with regard to the adverse effect profile (hyperchloremic metabolic acidosis, AKI). But the results of the studies conducted till date have been conflicting and do not give a clear direction regarding the superiority of one fluid type over the other; therefore, we conducted this study to further investigate this aspect in the setting of a tropical country.

MATERIALS AND METHODS

The study was carried out in Department of Pediatrics of a tertiary care hospital, Dayanand Medical College and Hospital, Ludhiana. An open label randomized control trial [CTRI/2021/04/033284] was done on children from 1 month to 18 years of age who presented to the pediatric emergency from June 2021 to October 2022 and required resuscitation with intravenous fluid bolus(s) within 6 hours of admission. The institutional ethics approval was obtained.

Any child assessed to be in shock and in need of a fluid bolus of more than or equal to 10ml/kg within 6 hours of hospital arrival was considered to be eligible for enrollment and written informed consent was obtained from the parent or guardians of all participants.

Shock was defined clinically by the presence of one or more of: Tachycardia, poor peripheral pulses, cold peripheries, delayed capillary refill time >2 seconds, systolic blood pressure <5th centile for age, decreased urine output [39]. Fluid bolus therapy was defined as a minimum of 10 mL/kg; rapidity decided depending on the type of shock at any time within 6 hours of admission.

SAMPLE SIZE CALCULATION

The objective of the study was to compare a balanced electrolyte solution [Plasma-Lyte] with normal saline (NS) as resuscitation fluid in children presenting to pediatric emergency

Outcome parameter = Change in serum bicarbonate from baseline [at admission] when compared to values at 24 hours, 48 hours and 72 hours as well as its worst value

The formula used is as under:

n = (σ 1 2 + σ 2 2) (Z α + Z β) 2 / (m 1 – m 2) 2

Where,

Zα = Value of standard normal variate corresponding to α level of Significance

Z β = the standard normal deviate for desired power

m = Average

σ = Standard deviation

Assumptions:

From the study conducted by Allen, et al [20], values for serum bicarbonate from baseline in Plasma-Lyte and Normal saline Group in children with moderate to severe dehydration secondary to acute gastroenteritis (AGE).

Mean change of serum bicarbonate from baseline in Plasma-Lyte Group (m 1) = 1.6

Mean change of serum bicarbonate from baseline in Normal saline Group (m 2) = 0

Coefficient of variation = 150%

Standard deviation of serum bicarbonate (σ 1) = 2

Version 1.0 dated 03/ Dec/2020

Standard deviation of serum bicarbonate (σ 2) = 2

Change in the parameters (m1– m 2) = 1.6

With the above assumptions the sample size for 95% confidence level & amp; 80% power works out 40 in each group.

NUMBER OF CASES: 80 patients [40 in each group].

Randomization and allocation concealment

Block randomization method was done using the computer-generated randomized sequence. Randomization sequence included 10 uniform sized blocks with each block containing 8 subjects for study (4 each belonging to Plasma-Lyte and Normal Saline). Prior to the initiation of study, generation of random sequence and concealment of allocation was done by assigning the sequence into opaque sealed envelopes by a social healthcare worker who was unrelated to the study. Hence, neither front-line care providers, investigators or participants were aware of whether the next eligible participant will be receiving intervention fluid or standard treatment.

TREATMENT PROTOCOL

Following randomization, each patient received either of two study fluids based upon the randomization sequence. The amount and rapidity of fluid administered was decided by the treating team based on the type of shock and the ongoing hemodynamic status. After initiating boluses of the either fluid type, value of plasma bicarbonate, sodium, chloride, pH, creatinine and lactate were recorded at the baseline (admission), 24, 48 and 72 hours. The patients were monitored clinically and with laboratory investigations up till 72 hours.

INCLUSION CRITERIA

- Children aged 1 month to 18 years
- Requirement of fluid boluses of at least 10ml/kg within first 6 hours of hospital admission

EXCLUSION CRITERIA

- Known case of chronic kidney disease/ liver disease
- Diseases known to be associated with electrolyte disturbances attributed to the disease per-se or related to therapy
- Cases with Inborn errors of metabolism
- Refusal to give an informed consent

METHOD OF COLLECTION OF DATA

Baseline data including demographic data, history, and examination findings were recorded. Detailed history was obtained regarding factors which could affect the electrolyte and acid-base balance before the administration of study fluids; like adequacy of oral intake, type, quantity of fluids received, estimate of urine output, status of hydration from ongoing losses in form of vomiting, loose stools. All children who were enrolled into the study were assessed for their severity of illness and associated mortality risk using a standardized scoring system; PRISM-3 score. Score was calculated utilizing the Physiologic data based on the worst value within first 6 hours of admission.

All fluids administered were noted meticulously into the intake-output

charts. The quantity of each type of fluid bolus (PL or NS) received over the study period of 72 hours was recorded in ml/kg and compared between the groups. Any additive/fluid which could act as confounding factor was taken into account, compared between the groups and included in the evaluation of baseline characteristics. Eg; quantity (mEq/kg) of bicarbonate, sodium or chloride from injections like hypertonic saline, sodium bicarbonate or potassium chloride was also noted so that appropriate matching could be done.

MATERIALS & EQUIPMENT DETAILS

1. Fluids administered:

a. Balanced salt solution used was Plasma-Lyte A; manufactured by Baxter, India. It was available as a clear solution supplied in polyolefin/polyamide plastic bags (VIAFLO). Each bag volume was 500ml and wrapped in a sealed, protective, outer plastic over pouch.

b. Normal saline used was manufactured by B Braun Medical India Pvt Ltd. Available as a clear solution in plastic bottles.

2. Blood samples

a. Blood gases: All blood gases were processed using GEM Premier 3500 system with Intelligent Quality Management (iQM) branded by instrumentation laboratory. Point of Care analysis of pH, bicarbonate, lactate, base excess was done. Blood sample was drawn into pre-heparinized syringes.

b. Renal function: Serum sample for sodium, chloride and creatinine was processed using Cobas® 8000 modular analyzer by Roche Diagnostics or using AU5800 Series Clinical Chemistry Analyzer by Beckman Coulter.

Due precautions were taken during blood sampling to minimize errors: while taking sample if arterial/ venous line was used, 5 ml blood was removed prior to collection of sample for analysis so as to avoid dilution of sample by intravenous fluids.

Sample collection for blood gas analysis was done in pre-heparinised syringes and care was taken to avoid air mixing and removal of dead space prior to sending sample to laboratory for analysis.

Outcome measures

Primary outcome of the study was to assess change in serum bicarbonate at 24, 48 and 72 hours as compared to the baseline values collected prior to administration of fluid bolus.

Secondary outcomes studied were change in serum electrolytes sodium and chloride), acid-base balance, incidence of normal anion gap metabolic acidosis, Acute Kidney Injury at 72 hrs (using KDIGO criteria) and efficacy measures like impact on ionotropic score (VIS), proportion of in-hospital all-cause mortality and length of hospital stay. For the laboratory variables; blood gas analysis and renal functions were monitored at admission, 24, 48 and 72 hours.

Additional parameters like need for renal replacement therapy need for blood products, vasopressors and ventilation were assessed. Vasoactive inotropic score was calculated for patients requiring inotropes within first 72 hours and their maximum score was also calculated.

PICTURE 2: Vasoactive Inotropic Score [VIS]

Vasoactive inotrope	**DAY 1**	**DAY 2**	**DAY 3**
Dopamine dose [µg/kg/min]			
Dobutamine dose [µg/kg/min]			
100 x Epinephrine dose [µg/kg/min]			
10 x Milrinone dose [µg/kg/min]			
10,000 x Vasopressin dose [U/kg/min]			
100 x Norepinephrine dose [µg/kg/min]			
Total VIS			
Maximum VIS			

VIS = Dopamine dose [µg/kg/min] + Dobutamine dose [µg/kg/min] + 100 x Epinephrine dose [µg/kg/min] + 10 x Milrinone dose [µg/kg/min] + 10,000 x Vasopressin dose [U/kg/min] + 100 x Norepinephrine dose [µg/kg/min]

Defining Metabolic Acidosis [40-41]

Base excess of ≤ - 5 mmol/L has been used to define metabolic acidosis

Anion gap was calculated by the formula [42]

- Anion Gap = Na - (Cl + HCO3)
    - A value of anion gap <12 mEq/L was taken as Normal anion gap

Defining Hypernatremia and Hyperchloremia [43]: value over and above age-appropriate normal range mentioned below

- Sodium value
    - Infant: 134-144 mmol/L

    - Child: 134-143 mmol/L
    - Thereafter: 135-145 mmol/L
- Chloride value: 98-106 mmol/L

Intention to Treat [ITT] approach was used i.e. all patients who were randomized were included in analysis irrespective of outcome/ inability to complete the 72 hour study period.

Statistical Analysis: Data was described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. To determine whether the data was normally distributed, a Kolmogorov-Smirnov test was used. Comparison of quantitative variables between the study groups was done using Mann Whitney *U* test for non-parametric data. For comparing categorical data, Chi square ($\chi 2$) test was performed and Fisher exact test was used when the expected frequency was less than 5. Covariates obtaining a P value <0.05 in the univariate analyses were included in the multivariate Binary logistic regression analysis. Kaplan–Meier curve for survival was plotted. A probability value (*p* value) less than 0.05 was considered statistically significant. Risk ratio/ relative risk was calculated wherever p value was indicative of significant difference between the calculated parameters. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

OBSERVATIONS AND RESULTS

A total of 80 patients were enrolled into the randomized control trial after screening patients for eligibility with inclusion and exclusion criteria. During the study period; 136 children needed fluid resuscitation. Amongst these, 56 were excluded as 2 children had chronic kidney disease, 11 were known case of nephrotic syndrome, 3 had chronic liver dysfunction owed to transfusion dependent thalassemia with viral hepatitis, 2 had renal disease (1 had solitary kidney with reduced renal function and for other child treatment record not available), 12 children were aged less than 1 month and for 26 children parents refused to give consent.

80 children who met eligibility criteria were randomized and analysed using intention to treat analysis.

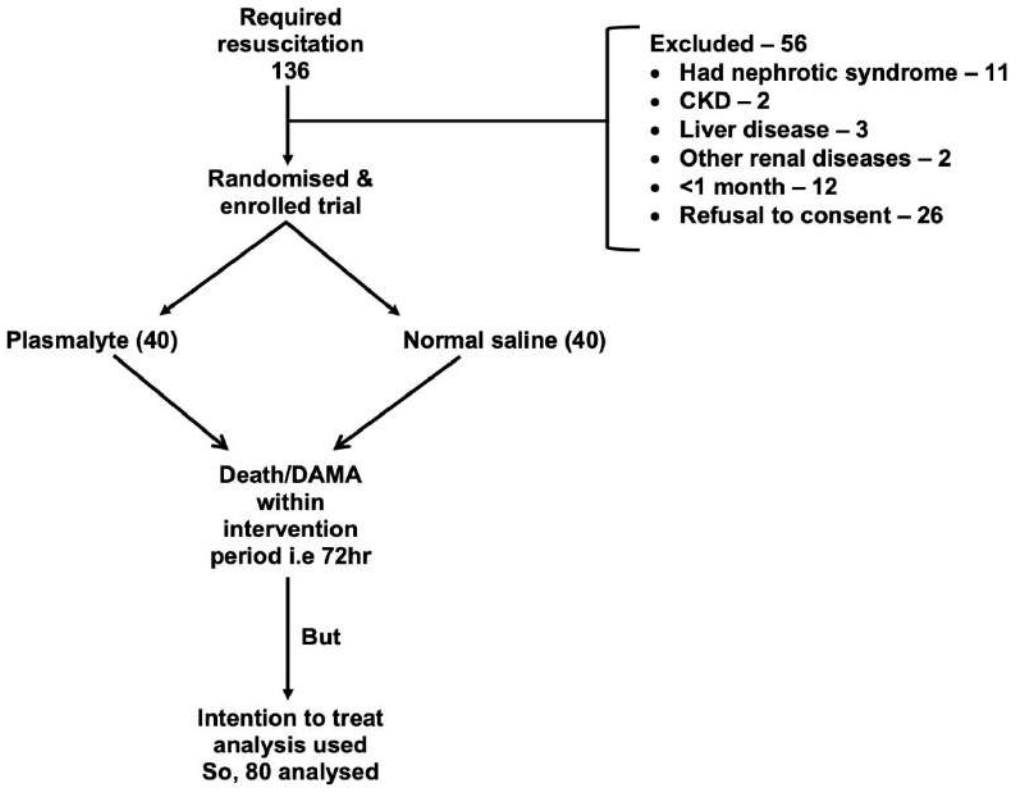

Figure 1: Study Flow Diagram

Baseline characteristics

The study groups were compared for their Baseline characteristics.

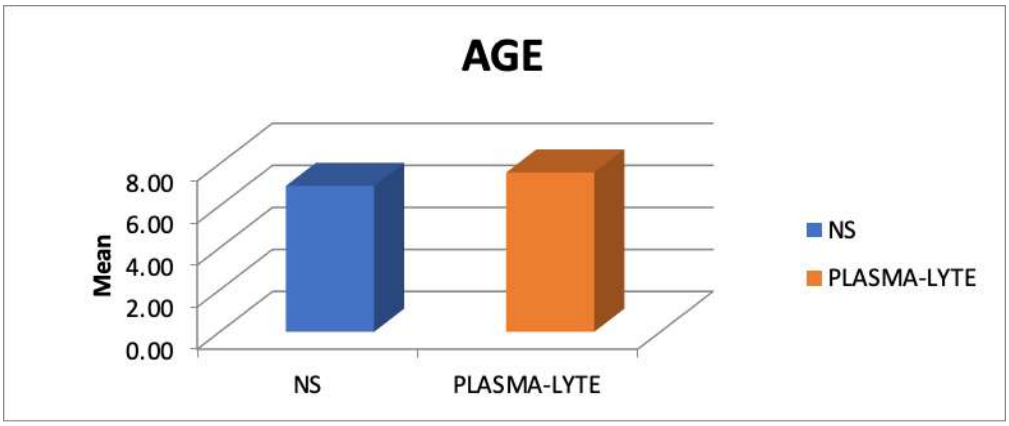

FIGURE 2: Mean age distribution

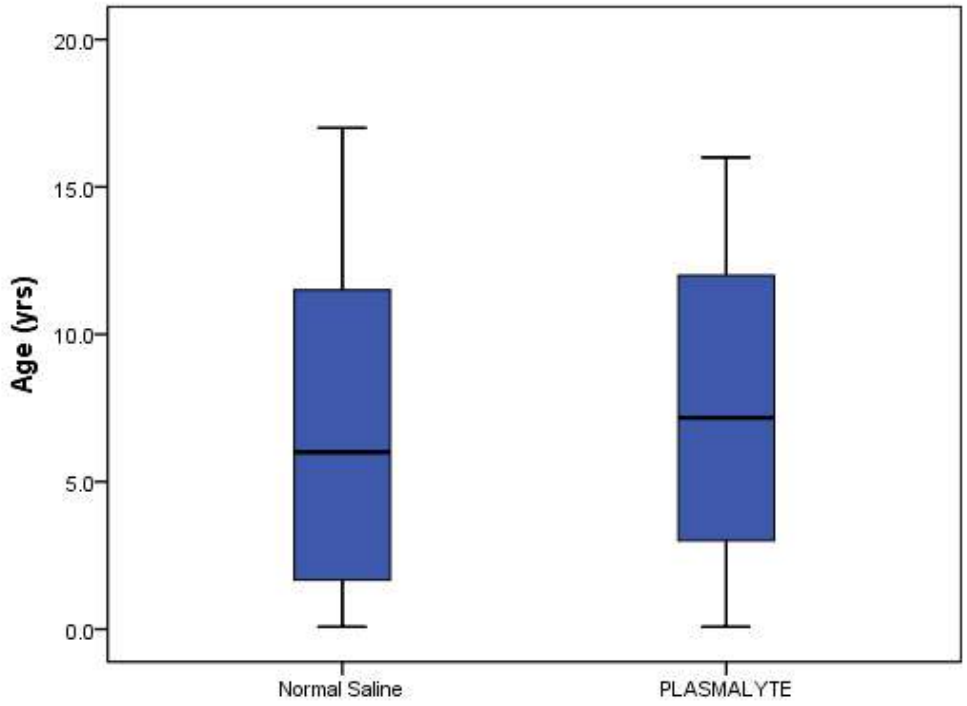

FIGURE 3: Box and Whisker plot for median age in two groups.

Mean age of patients enrolled into study was 7.5 years in PL group and 6.9 in NS group. Median age was 7.17 and 6 in PL and NS group respectively.

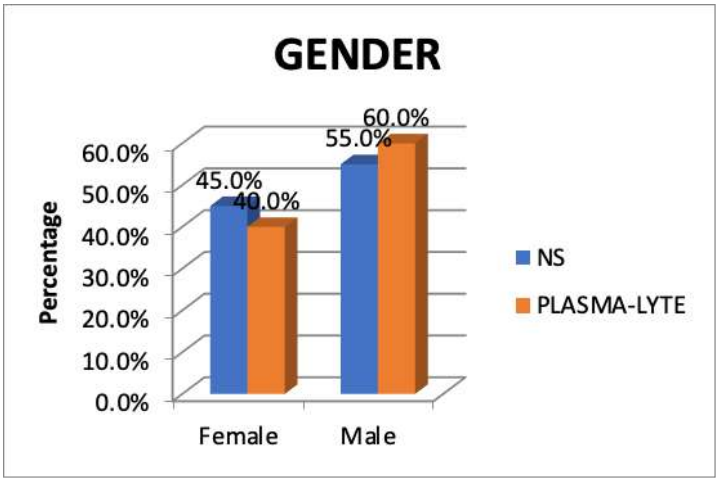

FIGURE 4: Percentage distribution based on gender.

Male: Female ratio was 1.5:1 and 1.2:1 in the PL and NS groups respectively

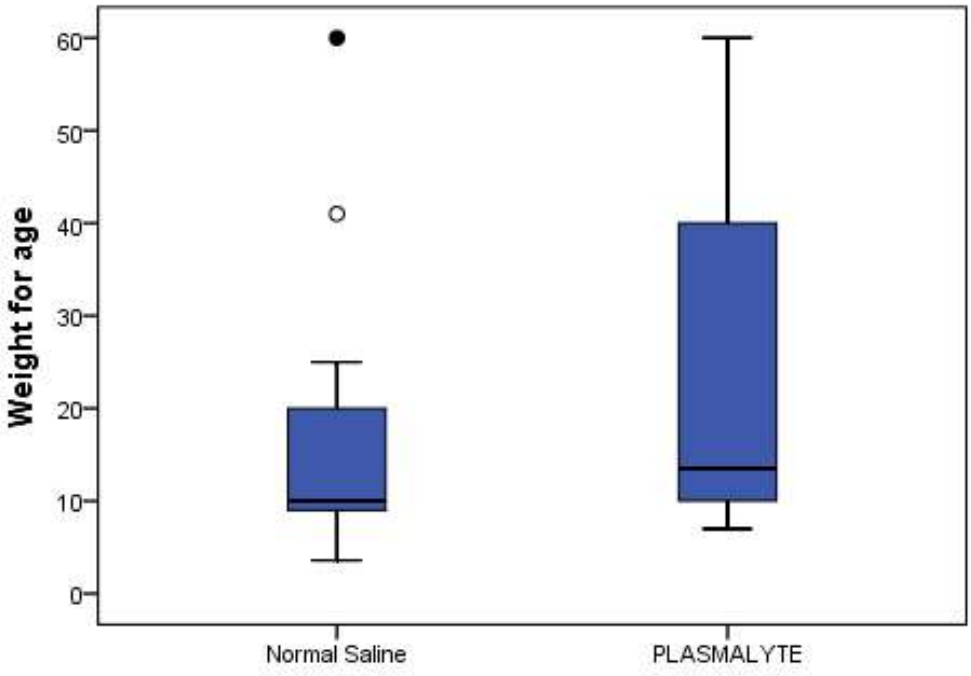

FIGURE 5: Box and Whisker plot for median Weight for Age

Median weight for age was 20 and 23 kg respectively in PL and NS group respectively.

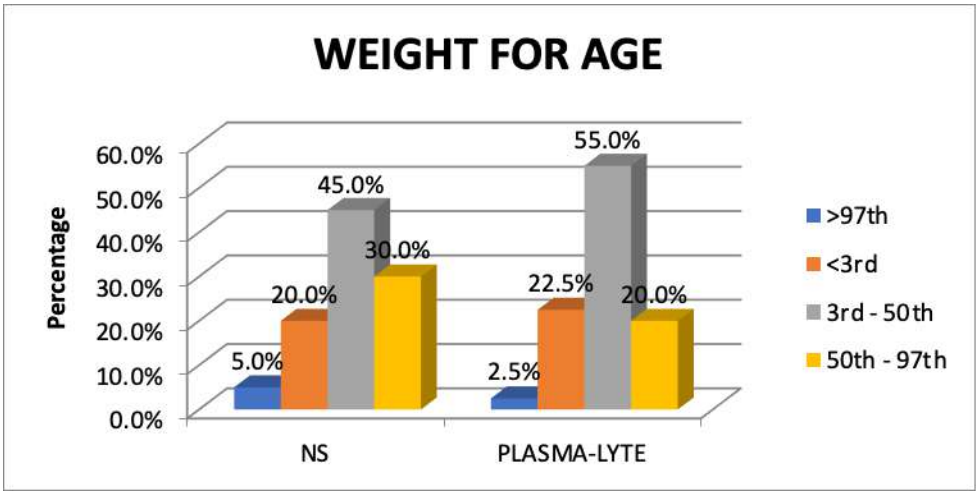

FIGURE 6: Percentage distribution of Weight for Age (based on centiles) 25% children in each group were in extreme centiles (<3rd or > 97th centile) of weight for age.

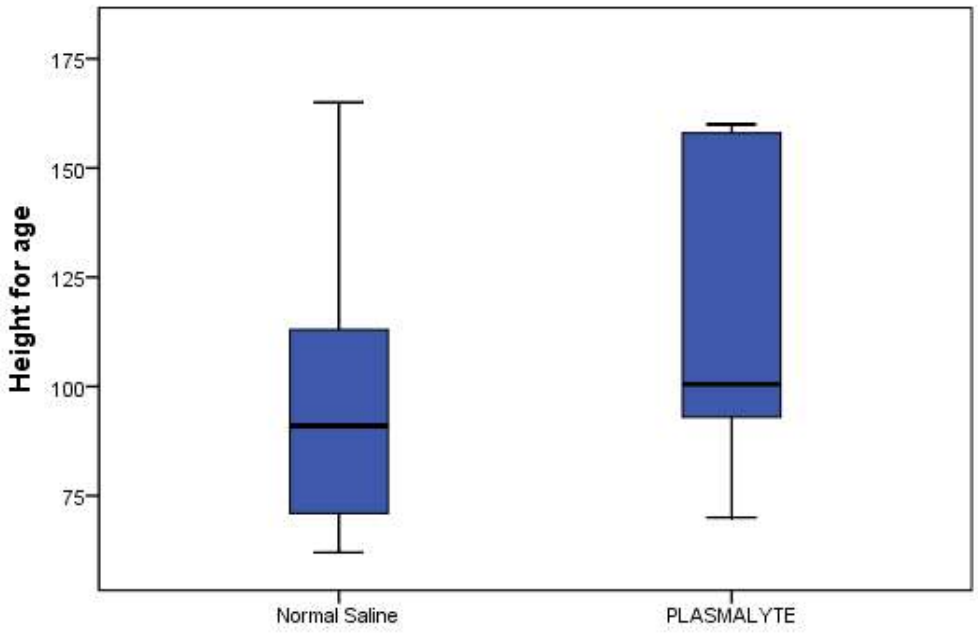

FIGURE 7: Box and Whisker plot for median Height for Age

Median (Interquartile range) height in PL group was 116.5 (92-154) centimeters and 114 (72-151) centimeters in NS group with a p-value of 0.319.

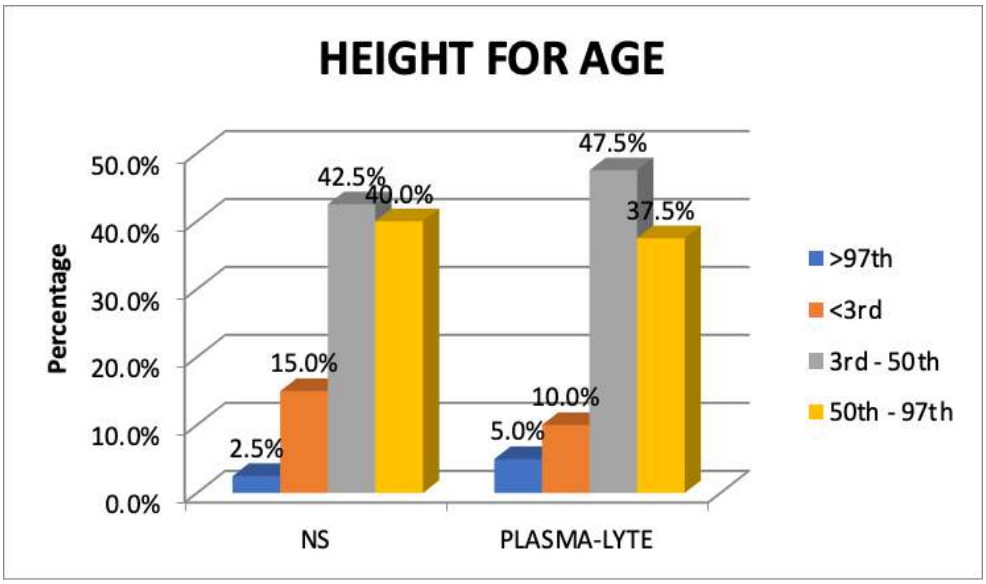

FIGURE 8: Percentage distribution of Height for Age (based on centiles)

15% patients in PL arm and 17.5% children in NS group were in extreme centiles (<3rd or > 97th centile) of weight for age.

Weight and height of children in the two groups were taken into consideration as malnutrition (both undernutrition and overnutrition-obesity) could be an important parameter affecting patient outcome as mortality is high in both the extremes. In our study both the study populations were comparable

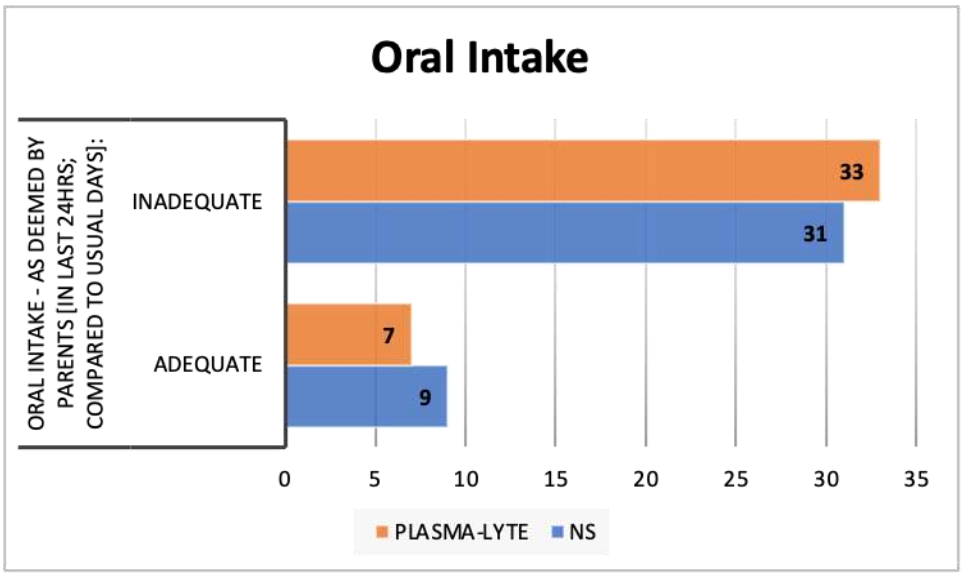

FIGURE 9: Number of patients in each group based on adequacy of oral intake

Oral intake was inferred from parents in terms of intake in last 24 hours when compared to the usual days. Oral intake was deemed to be inadequate in 82% children in the PL group and 77.5% in the NS subset.

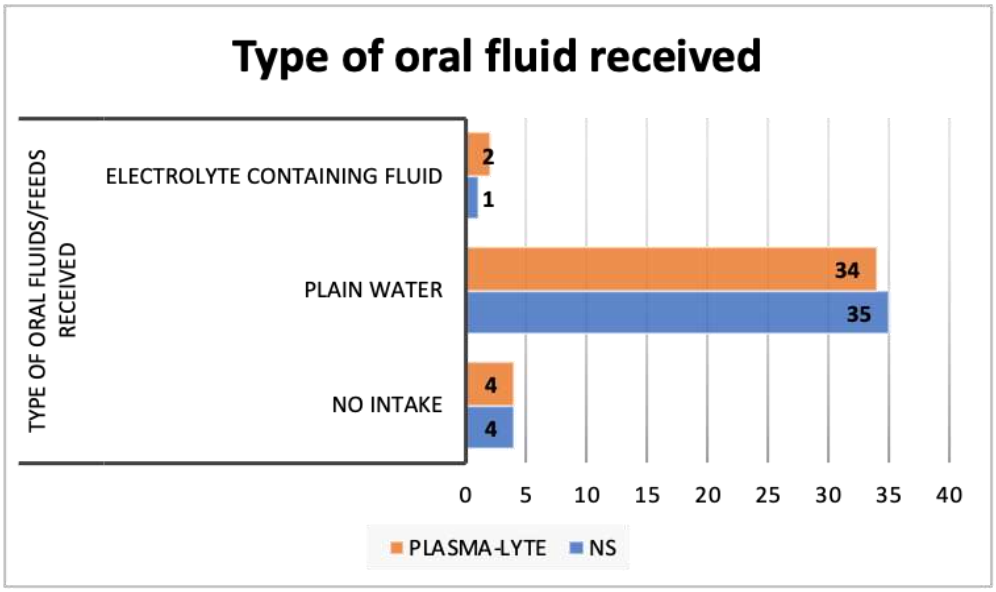

FIGURE 10: Number of patients in each group based on type of oral fluid received

Also, the types of fluids consumed were taken into account. Plain water was taken by 34 and 35 children in the PL and NS group respectively and

only 2 children had history of electrolyte containing fluid intake in the PL group. As per parents, there was no oral intake of any feeds or fluids in 4 children in each group.

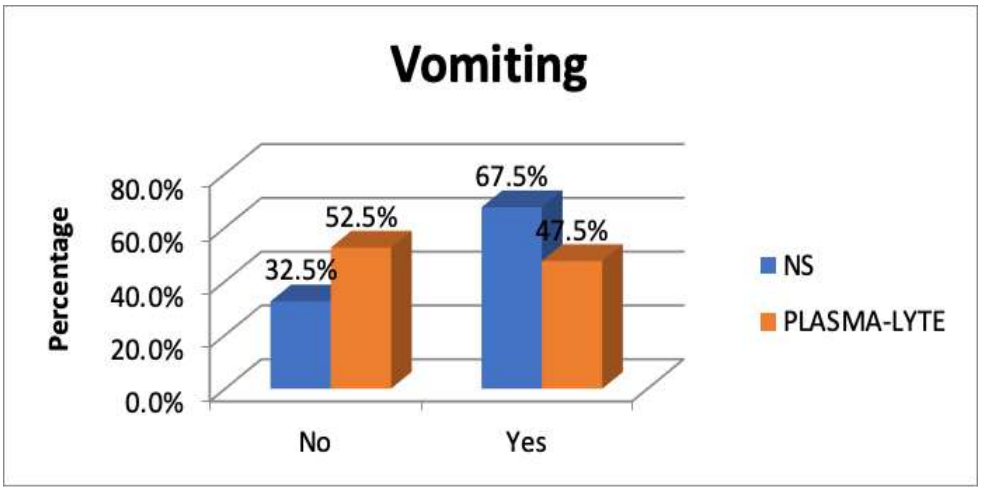

FIGURE 11: Percentage of patients in each group based on history of Vomiting

Vomiting was present in 47.5% children in Plasma-Lyte group and 67.5% children in Normal saline group. Although the number of patients with vomiting is high in normal saline group but did not reach statistical significance (p value 0.113)

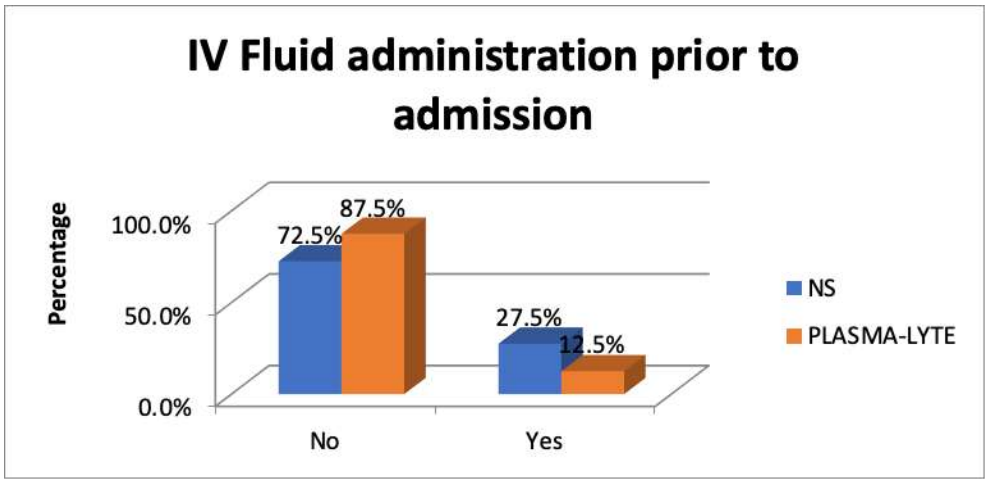

FIGURE 12: Percentage of patients in each group based on status of Intravenous fluid administration prior to admission

The study site is a referral centre so, many children presenting to hospital have already received some kind of intravenous fluid therapy prior to admission. Although we had excluded patients who had history of hospitalization for more than 24 hours prior of arrival at our hospital still 20% of our study population had received intravenous fluids before. Attempts were made to know the type and volume of fluid administered but record regarding fluid type could be obtained only for 6 patients and for none could we get history about volume of administered fluid.

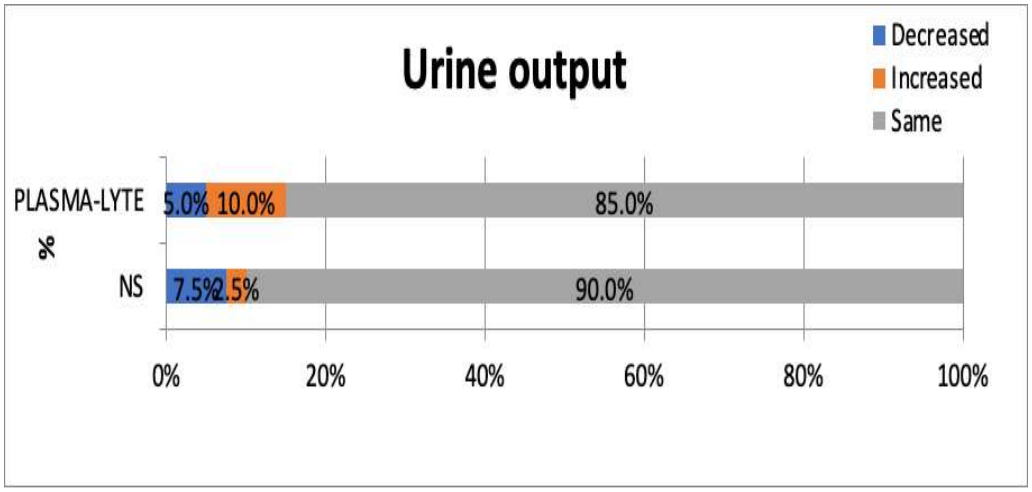

FIGURE 13: Percentage of patients in each group based on adequacy of Urine Output (as deemed by parents)

Status of urine output was noted to be decreased in 5%, same in 85% and increased in 10% children in the PL group and the two study groups were similar with a p value of 0.358.

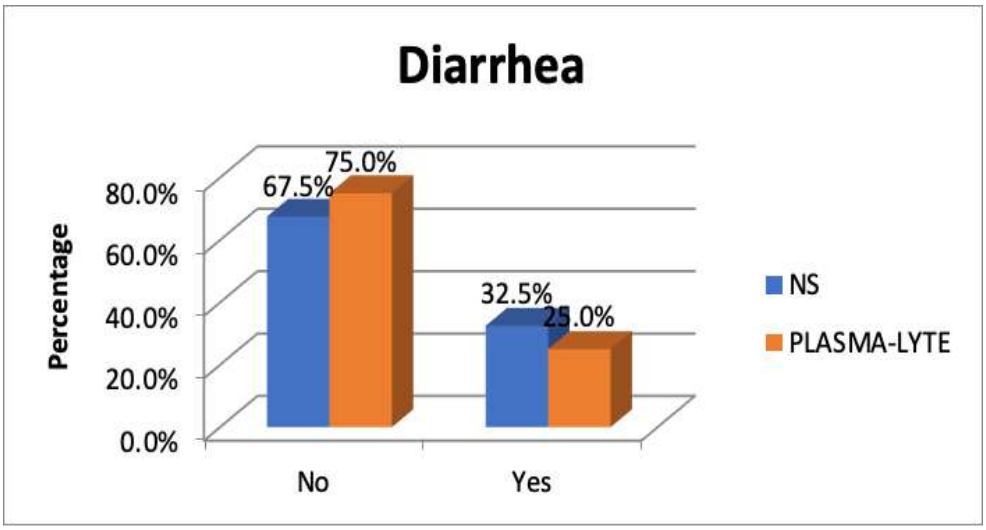

FIGURE 14: Percentage of patients in each group based on history of Diarrhea

Diarrhea was present in 25% and 32.5% children the PL and NS groups respectively.

After comparing the children based on their history; they were assessed clinically and admission status was taken into account. Severity of dehydration, presence of edema, monitoring for shock by means of capillary refill time, tachycardia, blood pressure, status of central and peripheral pulses was made note of.

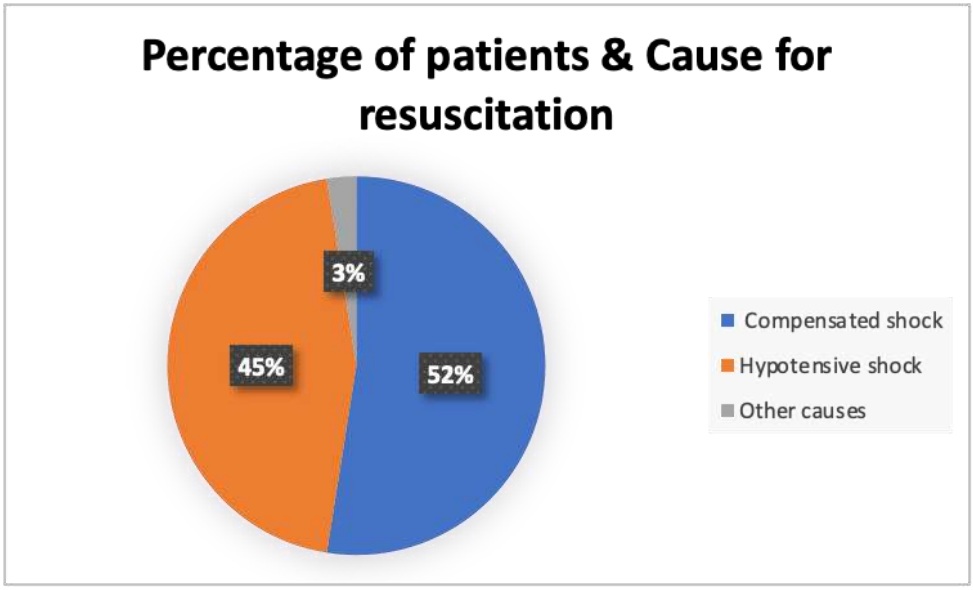

FIGURE 15: Overall percentage distribution of patients based on cause for resuscitation

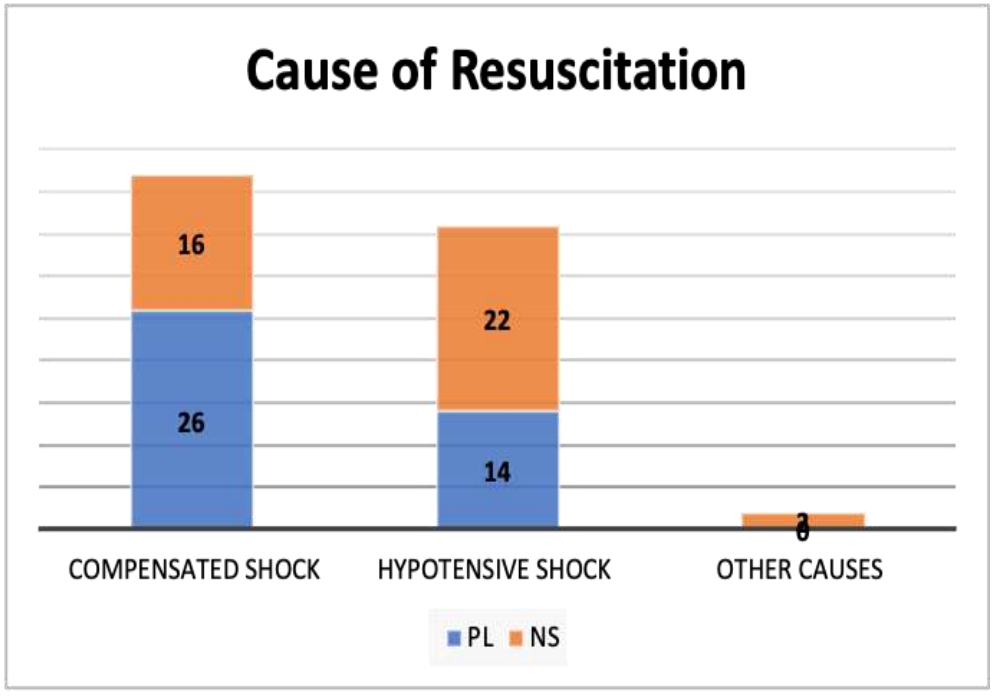

FIGURE 16: Percentage distribution of patients in each group based on cause for resuscitation

Based on assessment of clinical parameters, 45% were found to be in hypotensive shock, 52% in compensated shock with the left 3% being

given fluid resuscitation for other causes like diabetic ketoacidosis. Patient distribution in the two groups was analogous (p value 0.172). Number of patients with compensated shock was significant in PL group (p-value 0.025) but following univariate regression analysis; value was noted to be insignificant.

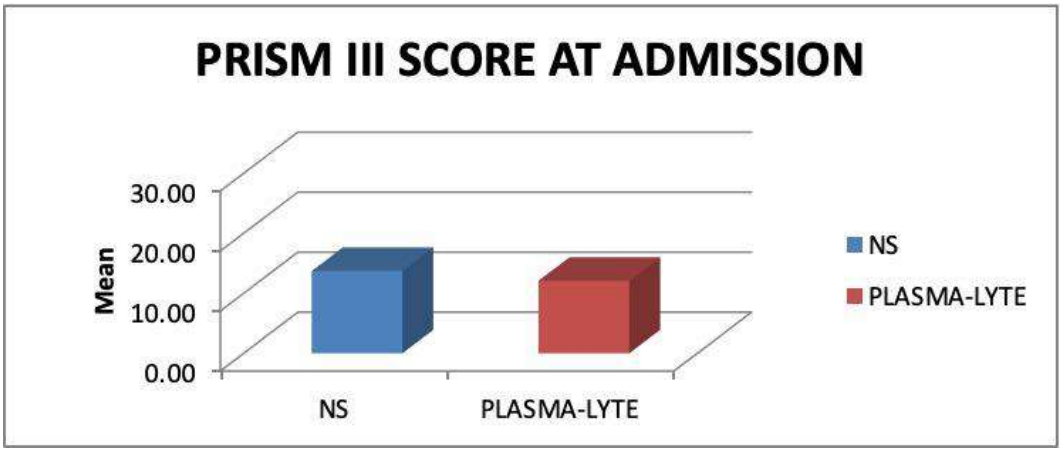

FIGURE 17: Distribution of patients in each group based on mean PRISM III Score at admission

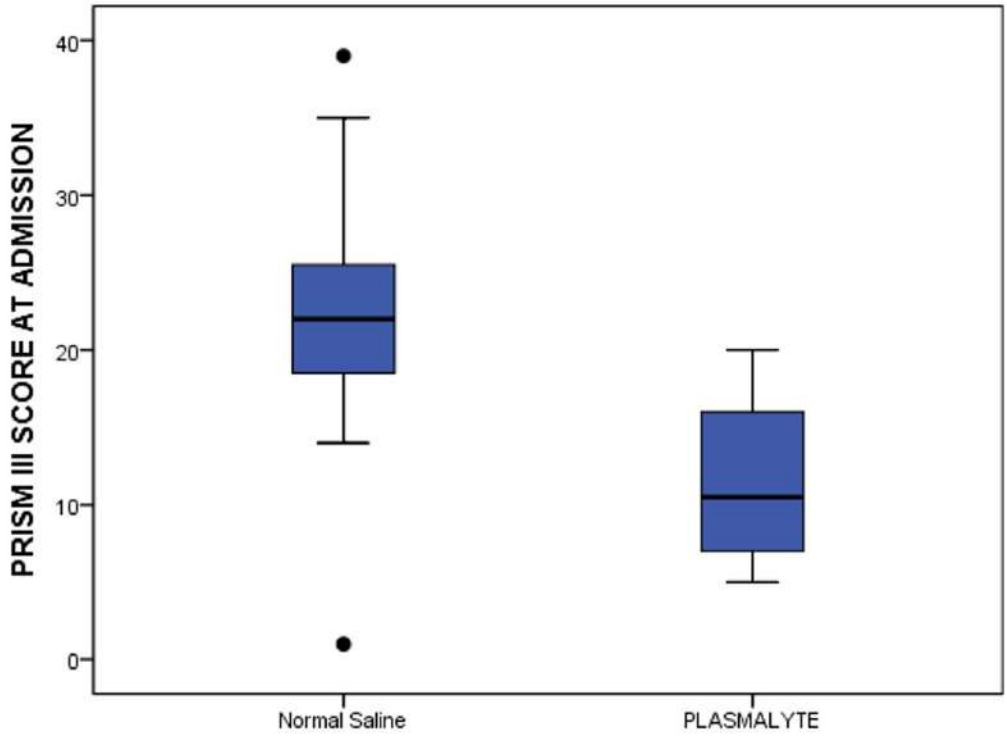

FIGURE 18: Box and Whisker plot for PRISM III Score at admission

PRISM Score (Pediatric Risk of Mortality Score) was calculated for each child within 6 hours of admission and worse score was taken into consideration. The scores were comparable in two groups (p value 0.82) with a median of 11 and 12.5 respectively in the PL and NS group respectively whilst the mean was 12.1 and 13.7 respectively.

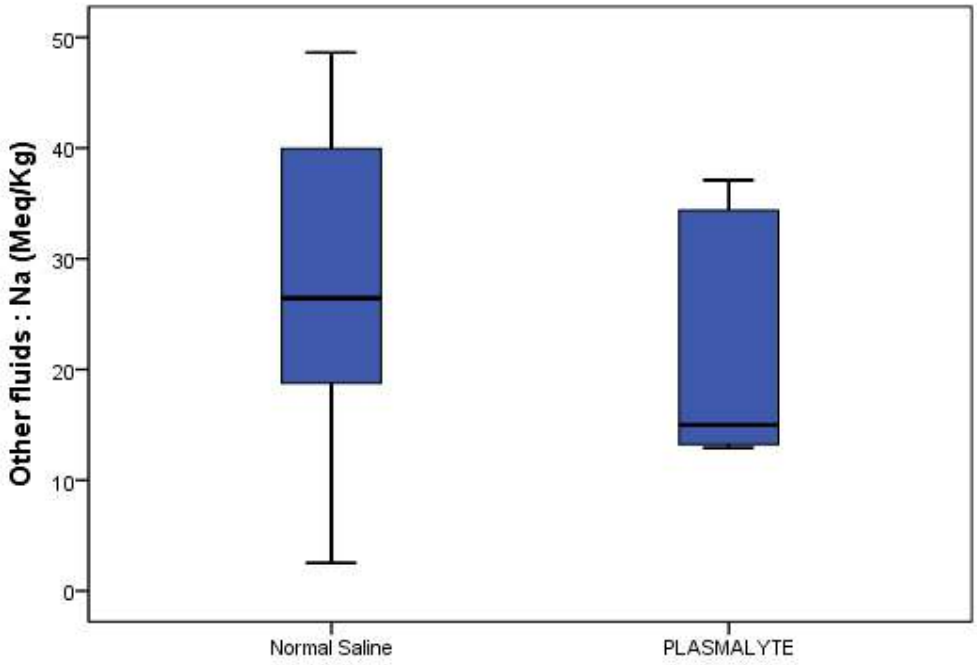

FIGURE 19: Box and Whisker plot for median Sodium (in mEq/kg) administered from sources other than resuscitation fluid

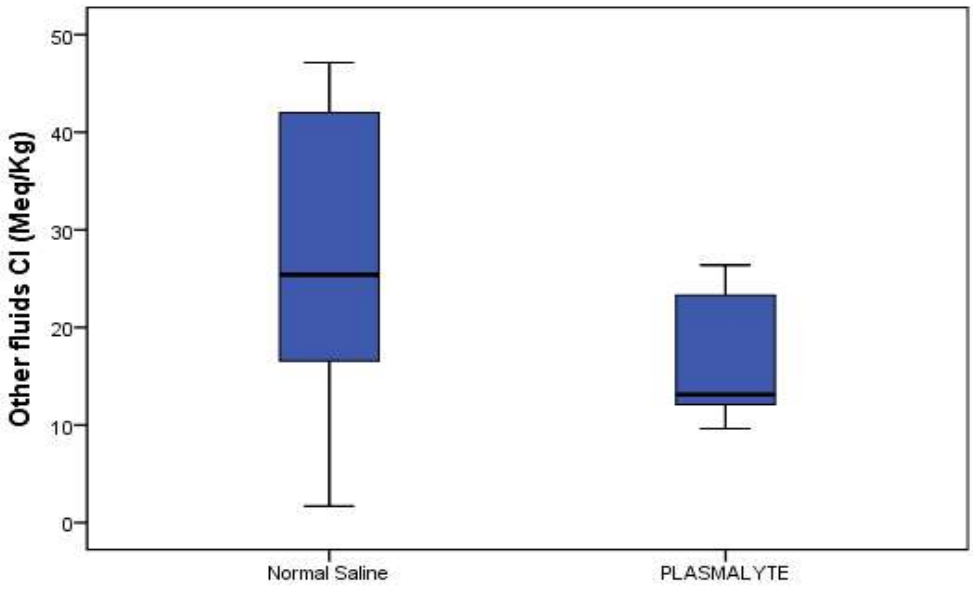

FIGURE 20: Box and Whisker plot for median Chloride (in mEq/kg) administered from sources other than resuscitation fluid

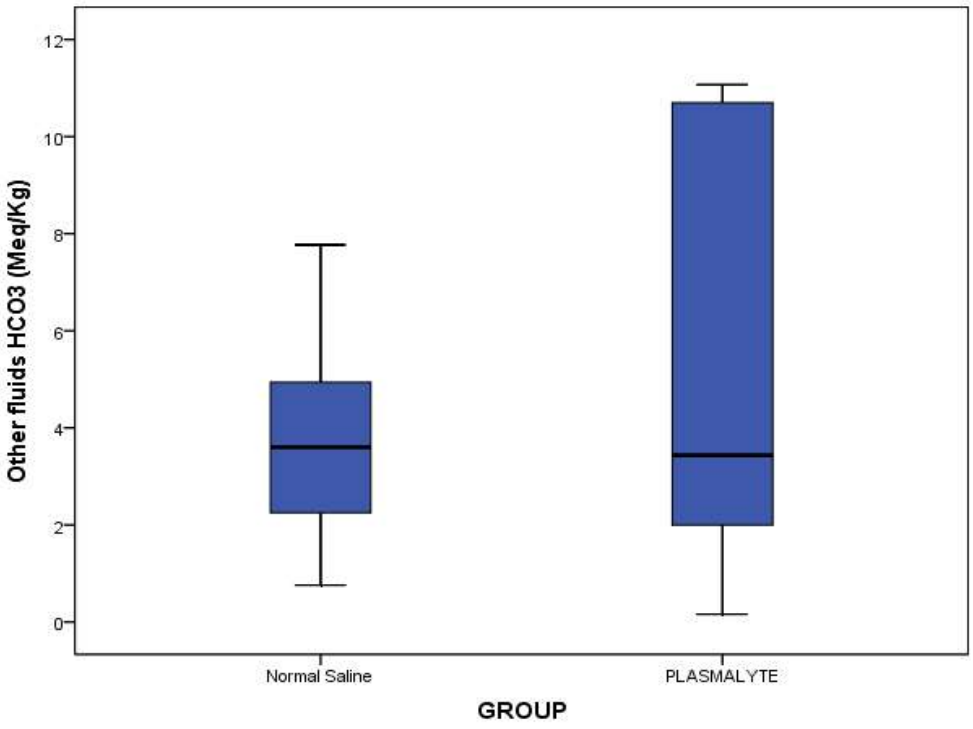

FIGURE 21: Box and Whisker plot for median Bicarbonate (in mEq/kg) administered from sources other than resuscitation fluid

So as to maintain sanctity of the study and minimize false outcome parameters, any form of exogenous fluid administration was taken into account and mEq/kg of sodium, chloride and bicarbonate was calculated and groups were found to be similar with a p value of 0.565, 0.395 and 0.316 respectively.

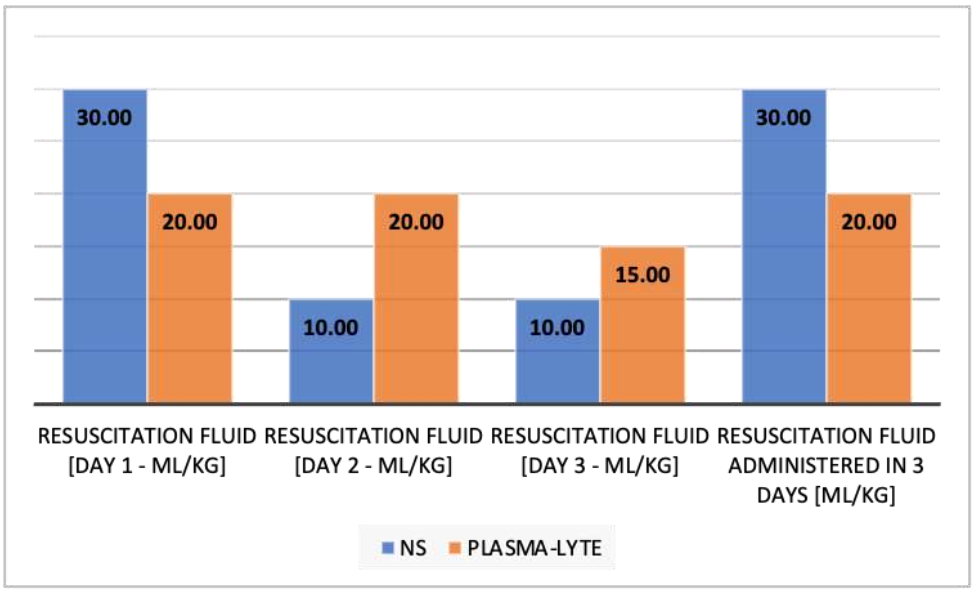

FIGURE 22: Mean Volume of resuscitation fluid administered in the two groups

Both groups were similar in all aspects the volume of resuscitation fluid administration required in the two subsets. The median resuscitation fluid volume [ml/kg] administered had a significant p value for volume administered on day 1 (p-value 0.022) and day 2 (p-value 0.045); patients in PL group required less amount of resuscitation fluid in ml/kg in comparison to NS group. Because of this difference; univariate regression was applied and two groups were matched before analyzing outcome parameters.

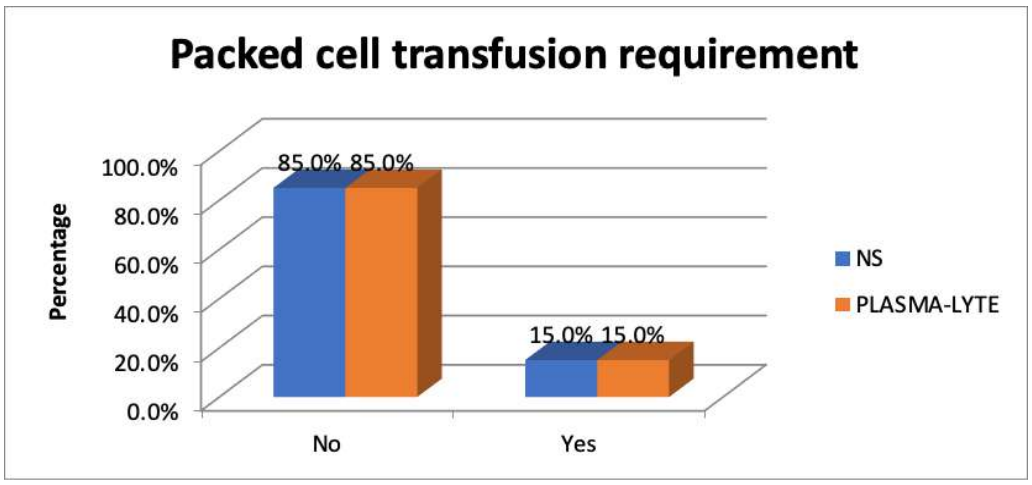

FIGURE 23: Percentage of patients requiring packed cell transfusion in each group

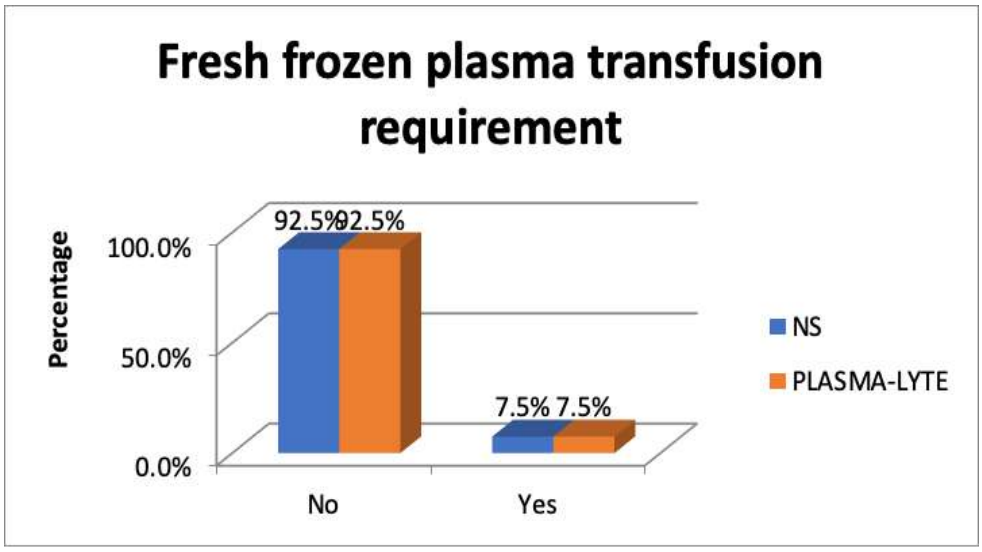

FIGURE 24: Percentage of patients requiring fresh frozen plasma transfusion in each group

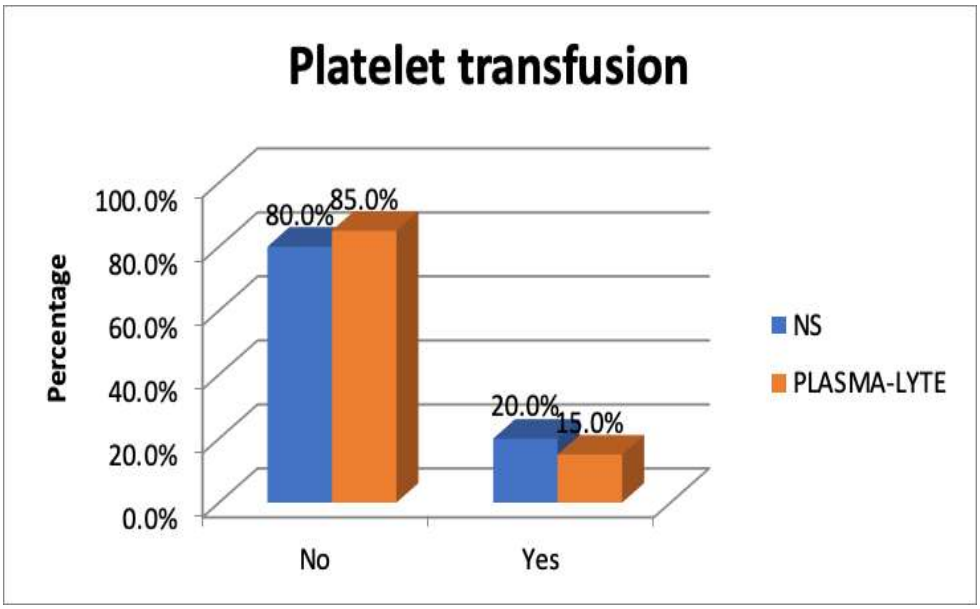

FIGURE 25: Percentage of patients requiring Platelet transfusion in each group.

Blood product transfusion requirement was found to be same in the two groups for packed cells and fresh frozen plasma. Platelet transfusion need was more in NS group but not statistically significant (p-value 0.556).

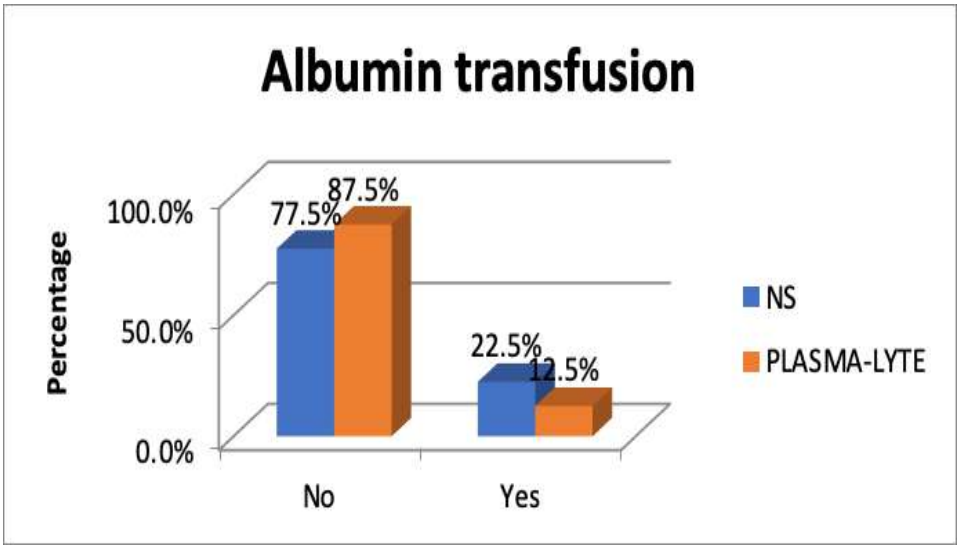

FIGURE 26: Percentage of patients requiring Albumin transfusion in each group.

Albumin was transfused 12.5% patients in the PL group and 22.5% patients in NS group.

Table 1: Baseline characteristics of the study groups

CHARACTERISTICS		PLASMA-LYTE (n=40)	Normal Saline (n=40)	P value
Age		7.17 (3 – 12)	6.00 (1.3–11.75)	0.525
Male Gender (n)[a]		24	22	0.651
Weight for age (kilogram)		20.00 (12.08 - 35.75)	23.00 (10.00 – 43.25)	0.693
Height for age (centimeters)		116.50 (92.25-154.75)	114.00 (72.50–151.75)	0.319
Oral intake adequacy (n)[a]		7.00	9.00	0.576
Urine output (Adequacy as deemed by parents) (n)[a]	Decreased	2	3	0.358
	Increased	4	1	
	Same	34	36	
Vomiting (n)[a]		19	27	0.113
Diarrhea (n)[a]		10	13	0.459
Resuscitation fluid administered in 3 days[ml/kg]		20 (10.00–40.00)	30 (20.00–45.00)	0.254
Resuscitation fluid [Day 1-ml/kg]		20 (10.00– 30.00)	30 (20.00–40.00)	0.022
Resuscitation fluid [Day 2 - ml/kg]		20 (15.00– 30.00)	10 (10.00–20.00)	0.045
Resuscitation fluid [Day 3 - ml/kg]		15 (10.00– 35.00)	10 (10.00–30.00)	0.696
Bicarbonate (mEq/kg) exogenously administered		7.14 (2.32–12.52)	3.80 (1.98– 6.20)	0.316
Sodium (mEq/kg)[b]		21.96 (10.74-28.48)	21.93 (14.27-29.08)	0.565
Chloride (mEq/kg)[b]		23.00 (9.77 – 28.42)	23.15 (13.56 – 31.70)	0.395
KDIGO score at admission		0 (0 – 1)	0 (0 – 1)	0.817

Data expressed as: Median (Inter Quartile Range)

(n)[a]: refers to the number of patients

[b]: electrolyte from other sources- additives and maintenance fluids

Table 2: Baseline characteristics of the study groups (cont.)

CHARACTERISTICS		PLASMALYTE (n=40)	Normal Saline (n=40)	P value
Basis of resuscitation (n)	Hypotensive shock	14	22	0.072
	Compensated shock	26	16	0.025[d]
	Others[c]	0	2	0.152
PRISM Score		11.00 (7.00 – 16.00)	12.50 (6.00 – 20.75)	0.825
Baseline bicarbonate (mmol/L)		18.75 (9.18 – 23.78)	18.30 (10.53 – 23.03)	0.969
Baseline lactate (mmol/L)		2.60 (1.70 – 4.85)	3.15 (1.83 – 5.25)	0.488
Baseline Sodium (mmol/L)		139.00 (134.25–142.75)	136.00 (131.00-139.75)	0.059
Baseline Chloride (mmol/L)		104.00 (101.00-107.75)	101.00 (97.25-109.75)	0.238
Baseline creatinine (mg/dl)		0.61 (0.37 – 0.94)	0.65 (0.40 – 0.97)	0.587
Baseline pH		7.32 (7.13 – 7.42)	7.34 (7.19 – 7.42)	0.405
Base excess (mmol/L)		-8.75 (-20.93 - -1.03)	-8.90 (-18.85 - -2.28)	0.885
Blood products (n)[a]	Packed cell	6	6	1.000
	FFP	3	3	1.000
	Platelets	6	8	0.556
Albumin transfusion (n)[a]		5	9	0.239

Data expressed as: Median (Inter Quartile Range)

(n)[a]: refers to the number of patients

[c]: refers to DKA

[d]: after univariate regression analysis p value was insignificant (p- value 0.642)

Primary Outcome

TABLE 3: Change in Serum Bicarbonate at 24, 48 and 72 hours compared to Baseline

Change in Serum Bicarbonate from baseline	PL*	NS*	P value	95% CI
At 24 hrs	2.84 (6.48)	3.39 (4.84)	0.899	0.88-1.36
At 48 hrs	5.98 (7.90)	5.88 (7.21)	0.969	0.73-1.17
At 72 hrs	9.07 (9.43)	8.98 (8.44)	0.814	0.82-1.18

**Values expressed as: mean (±SD)*

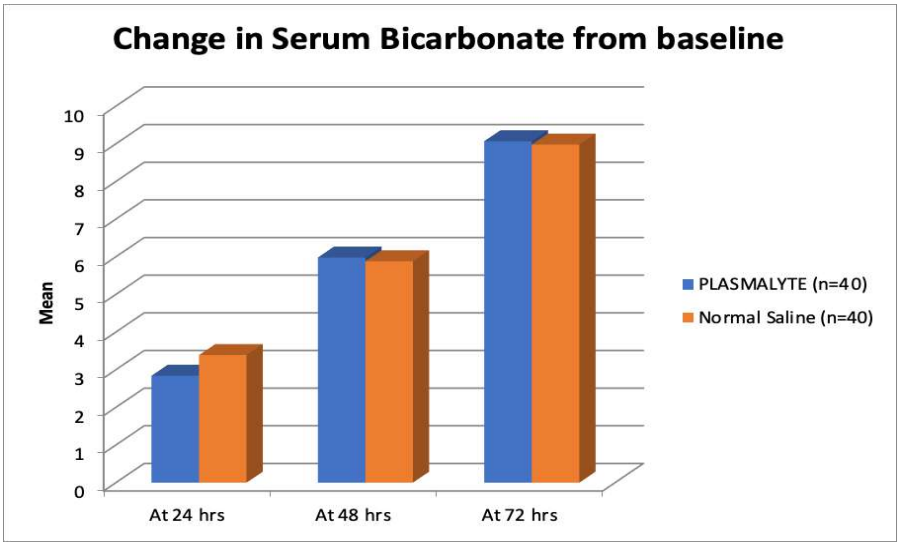

FIGURE 27: Mean Change in Serum Bicarbonate from baseline at 24, 48 and 72 hours

Serum bicarbonate change was taken as the primary outcome in the present study. The median bicarbonate (Interquartile range) value at admission was 18.75 (9.17-23.77) and 18.30 (10.52-23.02) at admission in PL and NS groups respectively with a p value of 0.969. There was no significant difference between the two groups with respect to change in serum bicarbonate from baseline value (at admission) to values observed at 24, 48 and 72 hours in both PL and NS groups.

Secondary Outcomes

Table 4: Secondary outcome measures among the study groups

Outcome Parameter		PL (n=40)	NS (n=40)	P value	Risk ratio (95% CI)
Change in sodium From baseline (mmol/L)	24 hrs	2.08 (5.90)	6.35 (8.29)	0.033[c]	0.913 (0.78-1.06)
	48 hrs	2.74 (7.10)	7.47 (9.60)	0.049[c]	1.021 (0.89-1.16)
	72 hrs	2.57 (7.61)	6.71 (10.81)	0.128	
Change in chloride From baseline (mmol/L)	24 hrs	5.75 (7.89)	9.19 (9.18)	0.143	
	48 hrs	5.03 (8.62)	8.84 (9.58)	0.161	
	72 hrs	3.37 (8.84)	5.86 (11.63)	0.441	
Change in pH From baseline	24 hrs	0.09 (0.17)	0.01 (0.39)	0.272	
	48 hrs	0.14 (0.20)	0.02 (0.41)	0.121	
	72 hrs	0.18 (0.24)	0.07 (0.45)	0.460	
Incidence of Normal Anion Gap Metabolic Acidosis (%)[a]	24 hrs	52.5	57.5	0.817	
	48 hrs	52.5	67.5	0.787	
	72 hrs	55	65	0.494	
New onset AKI (%)[a]		7.5	5	0.644	
Need for RRT (%)[a]		5	0	0.152	
Need for inotropes (%)[a]		37.5	67.5	0.013	0.543 (0.34-0.86)
Maximum VIS [b]		68 (37.5-350)	30 (20-84.5)	0.093	
Need for ventilation (%)[a]		50	55	0.013	0.905 (0.58-1.402)
Mean hospital stay (days)		9.28	12.78	0.042[d]	0.042

Data expressed in: Mean (±Standard Deviation) unless mentioned otherwise

[a]: Data expressed in percentage

[b]: Data expressed as Median (Interquartile Range)

[c]: change in sodium was significant between the groups at 24 and 48 hours but after univariate regression analysis the difference was insignificant (p- value 0.164 and 0.716 respectively for 24 and 48 hours)

[d]: after univariate regression analysis p value was insignificant (p- value 0.406)

The study groups had no variability in context to the change in chloride, pH, creatinine, lactate or base excess value but a significant difference in change of sodium levels was observed with a lower incidence of hypernatremia in PL group at 24 and 48 hours of study period.

TABLE 5: Change in Sodium at 24, 48 And 72 Hours From Baseline

Change in Sodium from baseline	PL		NS		Z	p-value
	Mean	SD	Mean	SD		
At 24 hours	2.08	5.90	6.35	8.29	2.135	0.033
At 48 hours	2.74	7.10	7.47	9.60	1.966	0.049
At 72 hours	2.57	7.61	6.71	10.81	1.521	0.128

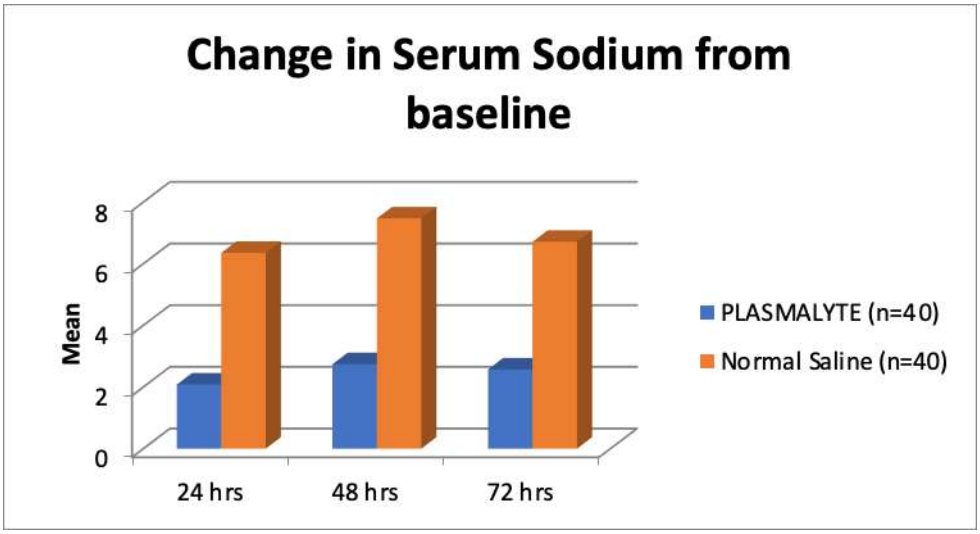

FIGURE 28: Mean Change in Serum Sodium from baseline at 24, 48 and 72 hours

A mean difference of 2.08, 2.74, 2.57 at 24, 48 and 72 hours was seen in PL group and 6.35, 7.47 and 6.71 at respective hours in NS group. P-value was found to be significant at 24 and 48 hours (0.033 and 0.049 respectively) but after univariate regression analysis values were insignificant (0.164 and 0.716 respectively).

TABLE 6: Change in Chloride at 24, 48 And 72 Hours from Baseline

Change in Chloride from baseline	PL		NS		Z	p-value
	Mean	SD	Mean	SD		
At 24 hours	5.75	7.89	9.19	9.18	1.465	0.143
At 48 hours	5.03	8.62	8.84	9.58	1.401	0.161
At 72 hours	3.37	8.84	5.86	11.63	0.771	0.441

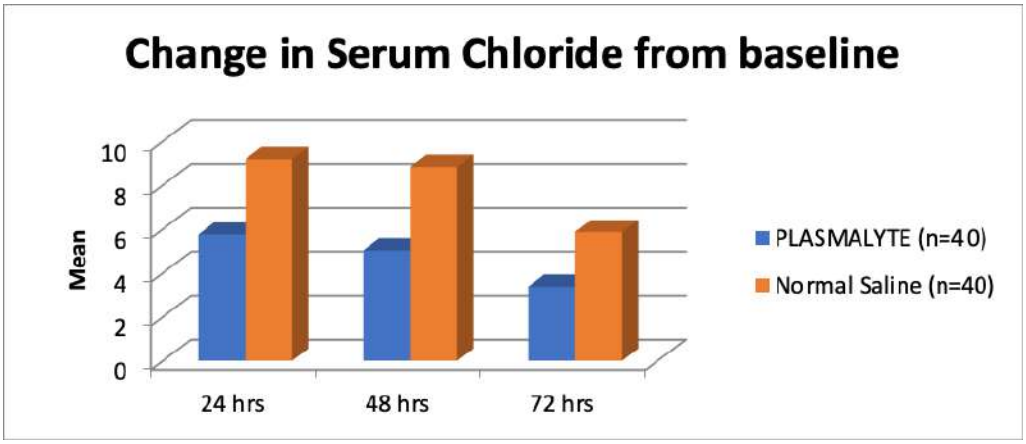

FIGURE 29: Mean Change in Serum Chloride from baseline at 24, 48 and 72 hours

Rise in serum chloride was observed in both groups but did not reach statistical significance.

TABLE 7: Change in pH at 24, 48 and 72 Hours from Baseline

Change in pH value from baseline	PL		NS		Z	p-value
	Mean	SD	Mean	SD		
At 24 hours	0.09	0.17	0.01	0.39	1.098	0.272
At 48 hours	0.14	0.20	0.02	0.41	1.549	0.121
At 72 hours	0.18	0.24	0.07	0.45	0.738	0.460

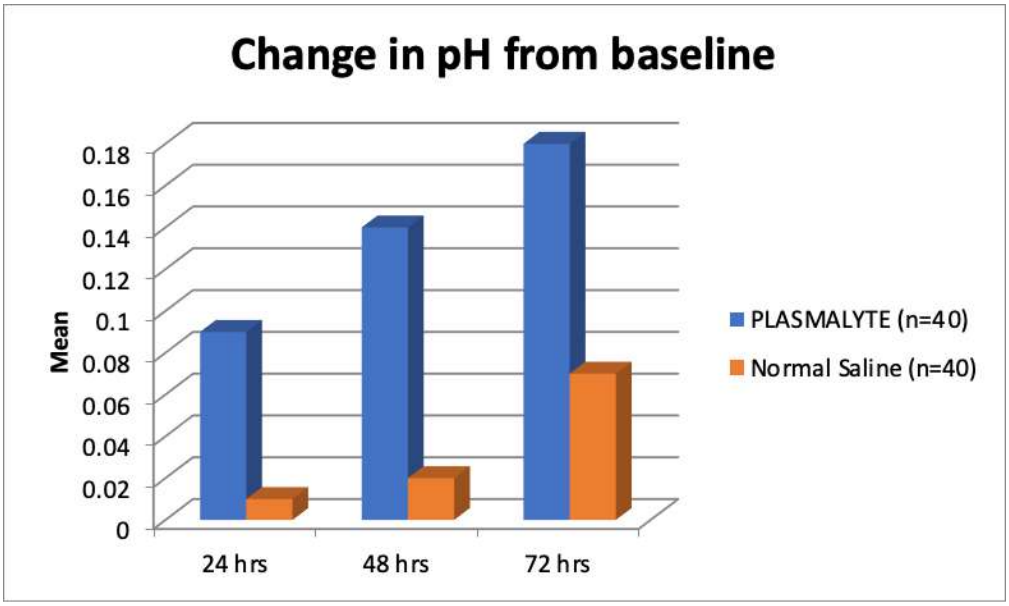

FIGURE 30: Mean Change in pH from baseline at 24, 48 and 72 hours

There was a decrease in acidosis in both groups but the difference did not show statistical difference.

TABLE 8: Incidence of Normal Anion Gap Metabolic Acidosis at 24, 48 and 72 Hours from Baseline

BASE EXCESS	ANION GAP	PL (n)	NS (n)	TOTAL	p-value
<-5 mmol/L	<12				
At admission		2	3	5	0.67
At 24 hours		8	9	17	0.753
At 48 hours		8	8	16	0.124
At 72 hours		5	3	8	0.655

n = number of patients

Also, it was noted that incidence of normal anion gap metabolic acidosis was similar in both groups. It was also noted that incidence of NAGMA increased from baseline up to 24 hours and then declined which can be attributed to usage of chloride containing fluids but the type of fluid did not make any significant difference.

TABLE 9: Incidence of new onset / progressive AKI at 72 hours from Baseline

		PL		NS		Total	Chi-square value	p-value
		n	%	n	%			
New onset AKI	No	37	92.5	38	95.0	75	0.213	0.644
	Yes	3	7.5	2	5.0	5		
Total		40	100.0	40	100.0	80		

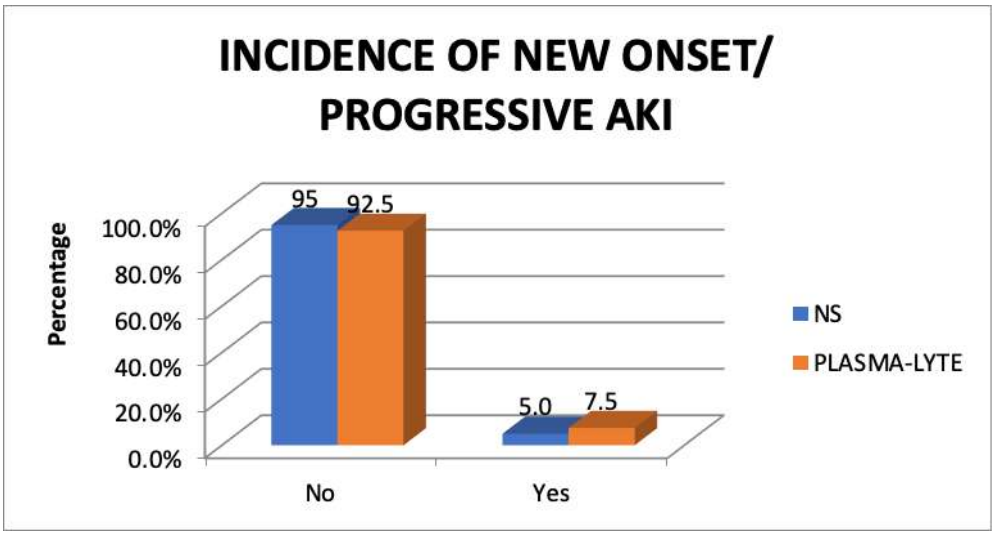

FIGURE 31: Percentage distribution based on incidence on new onset/ progressive AKI

The study showed that new onset AKI was not statistically. Also, it was noted that 5 out of 17 patients had progressive or new onset AKI and 11 showed an improvement in their KDIGO score and for 1 patient 72 hour analysis could not be obtained as child died within 24 hours of admission.

TABLE 10: Need for inotropes in initial 72 hours of admission

		PL		NS		Total	Chi-square value	p-value
		n	%	n	%			
Need for Inotropes	No	25	62.5	13	32.5	38	7.218	0.013
	Yes	15	37.5	27	67.5	42		
Total		40	100.0	40	100.0	80		

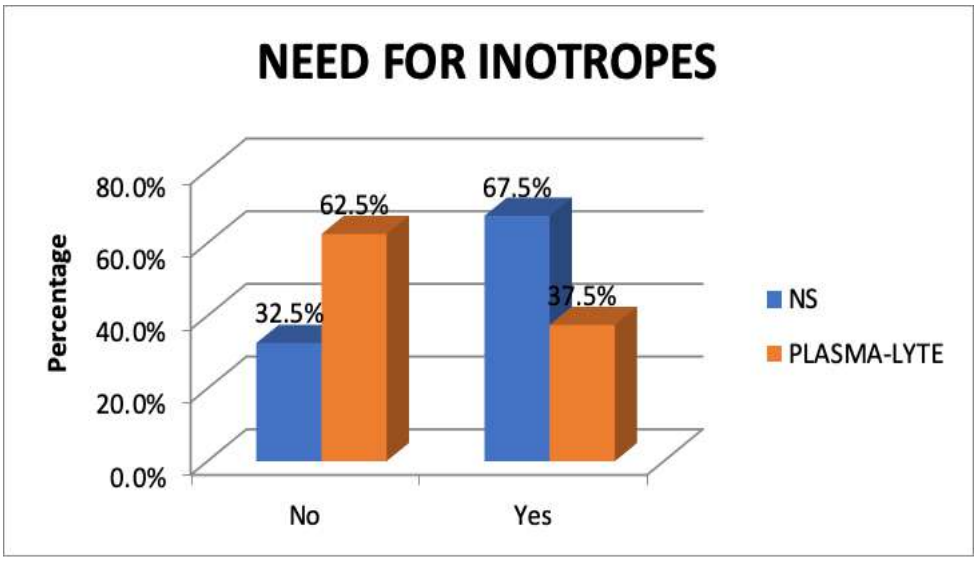

FIGURE 32: Percentage distribution based on proportion of patients needing inotropes

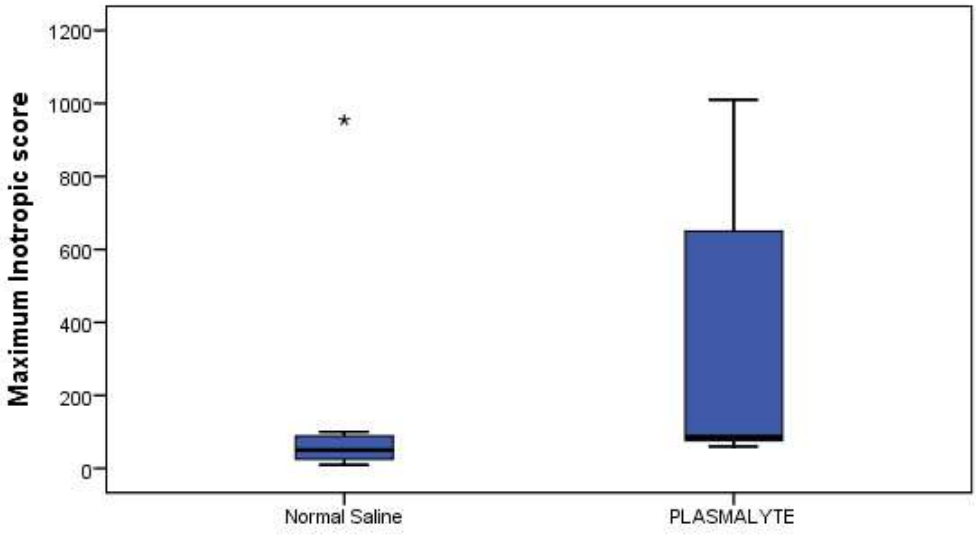

FIGURE 33: Box and Whisker plot for median Maximum Vasoactive Inotropic Score (VIS) within 72 hours from Baseline

Need for inotropes was found to be significantly more in NS group as compared to PL group (p-value 0.013) although both groups were comparable as regards the maximum Vasoactive inotropic score and the total duration of inotropes.

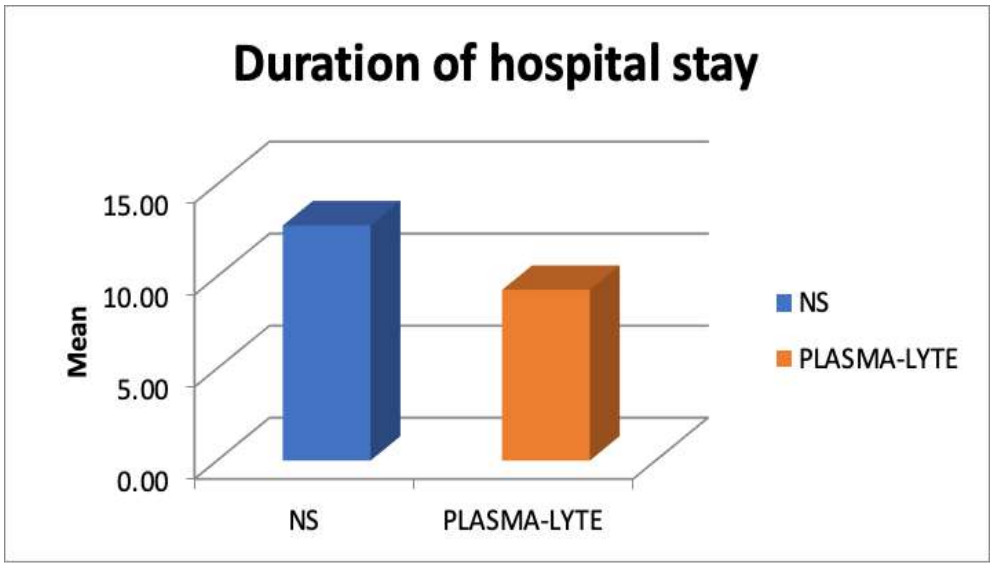

Figure 34: Mean distribution based on number of days of hospital stay

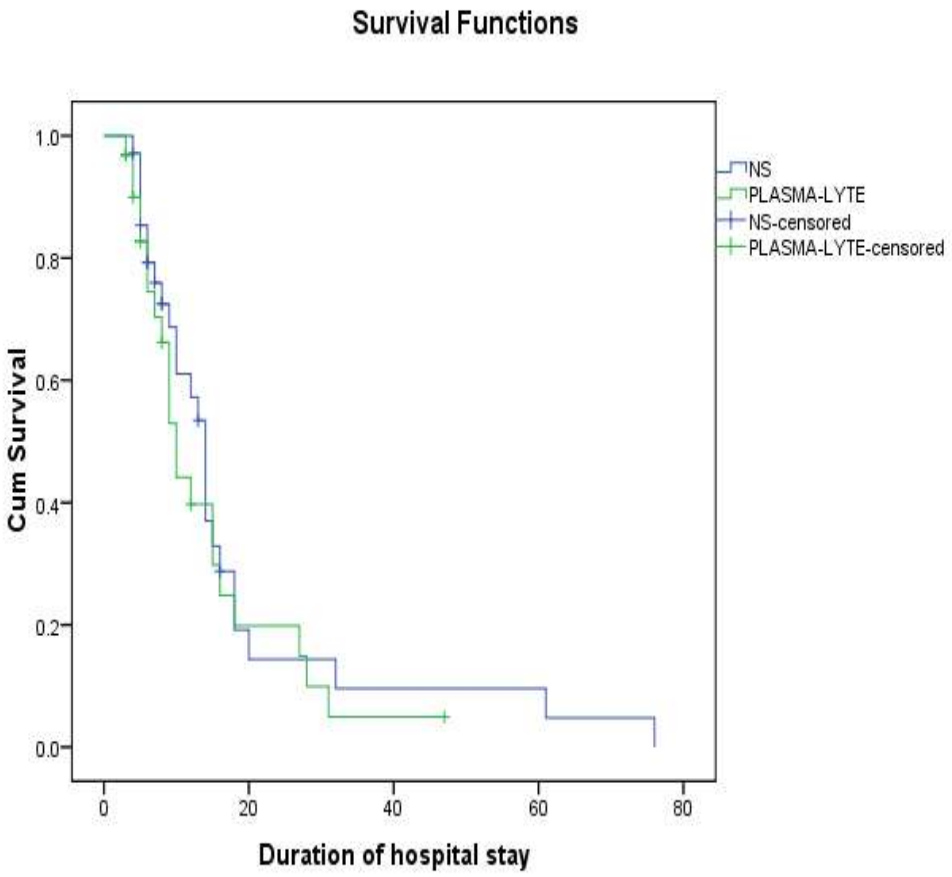

FIGURE 35: Kaplan-Meier survival curve for the two groups

Duration of hospital stay was lesser in the PL group (IQR 3.25-11.5) versus NS group (IQR 5.25-14) with a median reduction by 3 days in PL group (p = 0.042).

TABLE 11: Patient outcome

		PL		NS		Total	Chi-square value	p-value
		n	%	n	%			
Patient outcome	DAMA[a]	5	12.5	4	10.0	9	1.079	0.583
	Died	8	20.0	5	12.5	13		
	Improved & Discharged	27	67.5	31	77.5	58		
Total		40	100	40	100	80		

[a]: Discharge Against Medical Advise

The overall mortality of the study cohort was 16.2% (8 in PL group and 5 in NS group) although there was no mortality difference between the two groups (p = 0.583). Amongst those with mortality as the outcome; 5 patients (4 in PL and 1 in NS group) died within 72 hours of admission and 8 deaths after completion of study period.

DISCUSSION

Ideal fluid for pediatric resuscitation remains an area of debate as well as research in the wake of increasing concerns of hyperchloremic metabolic acidosis with the use of 0.9% saline owed to its supra-physiological concentrations of sodium and chloride. Plasma-Lyte being a chloride restrictive fluid as well as containing acetate and gluconate which are bicarbonate producing salts will help in countering hyperchloremia and acidosis component respectively.

The present study was done on 80 children who required resuscitation within first 6 hours of hospital admission. Blood gas and renal functions were estimated at admission along with comparison of certain demographic and clinical parameters so as to note the comparability of the study groups. The two study groups were similar with regard to their baseline characteristics. Fluid type and bolus volume administered over initial 72 hours of hospital admission were meticulously noted and mean volume was found to be 30.5 ml/kg in PL group and 32.4 ml/kg in NS group. As the study was done on sick children so, to assure conformity of the level of sickness and mortality risk amongst patients, PRISM score was calculated for each and the groups showed a parallelism in their scores. Impact on patient outcomes following resuscitation with PL was looked into. There was no statistical difference found with regard to our primary outcome (change in bicarbonate at 24, 48 and 72 hours) between the two study fluids. Even though the absolute incidence of hyperchloremia, less incidence of sodium imbalance at 24 and 48 hours, better pH, lactate values, reduced incidence of AKI, need for ventilation, duration of hospital stay was lesser in the PL group but the difference was not statistically significant so, both groups were similar. One aspect in which PL was found to be superior to NS was reduced need for inotropes. Also, at the same time we studied incidence of normal anion gap metabolic acidosis which was similar in the study groups.

Arya et al did a trial on 400 children presenting with shock comparing Plasma-Lyte and Normal Saline for its safety and efficacy in terms of impact on electrolytes and acid base balance following 6 hours when compared to that at admission [37]. Their study included patients upto 14 years of age who presented to emergency department with shock whilst in our study children till 18 years of age were included. At the same time, they studied outcome variables at 6 hours post admission and we followed patients serially at 24, 48 and 72 hours. They concluded that there is a significant change in pH (p-value 0.001), bicarbonate (p-value 0.001), chloride (p-value 0.02), lactate levels (p-value 0.03), and reduction in the need for vasopressors, mean duration of hospital stay, mortality in the PL group. Our study showed similar results for vasopressor need but for other outcome measures positive results were noted but did not reach statistical significance. As their sample size was large so, possibly they were able to detect a significant difference in outcomes. None the less; study period was short (6hours) for the composition of fluid to have an impact on the metabolic and acid-base balance profile of the subjects. Also, because causation of metabolic acidosis is multifactorial, we do not know the proportion of patients with hyperchloremic metabolic acidosis which is expected due to the difference in chloride content of the two crystalloids.

Allen and his co-workers conducted a multicentric study (pediatric emergency department at 8 study sites) on 77 children with acute gastroenteritis aged 6 months to 11 years where they used the two study fluids (PL and NS) for replacement in patients with moderate to severe dehydration and monitored for change in bicarbonate as a primary outcome [34]. They compared their parameters at 4 hours from baseline. They concluded that both fluids had similar safety profile and were well tolerated. Also, they found PL to be more effective than NS in correcting acidosis (bicarbonate change at 4 hours from baseline; p-value 0.004), improved clinical status of dehydration (Gorelick dehydration scale; p-value 0.03). These results are in discordance with our results. Even

though they found a greater improvement in bicarbonate in the PL group; the matching of the two study groups for their baseline characteristics appears unclear. Hence, we cannot be sure whether the two groups were comparable. Another reason for the disparity of results could be that our study included all critically ill children irrespective of the etiology while the study done by Allen et al included only patients with gastroenteritis.

William et al in their study including 66 subjects with diabetic ketoacidosis compared PL and NS for incidence of new or progressive AKI as a primary outcome following use as an initial fluid in children [38]. They assessed for AKI till 48 hours of hospital stay and found that although there is a slight increase in chloride levels in both the study arms but in none it translated to increased incidence of AKI. This was similar to the findings of our study. Similar to the authors result our study too showed a trend towards resolution of AKI over 72 hours when appropriate fluid therapy was given along with avoiding triggers which could aggravate renal injury suggesting that the renal parameters at admission were more related to pre-renal insult.

Jhuma Sankar et al also in his study compared use of balanced crystalloids to normal saline as initial fluid for resuscitation in children with septic shock [36]. They conducted this trial over 4 study sites and enrolled 708 children with age <17 years to study for the risk of AKI over first 7 days following fluid resuscitation as their primary outcomes. They concluded in their study that there is a significant reduction in the risk of new onset AKI in patients resuscitated with balanced crystalloids (Plasma-Lyte-A as a study fluid). In their study; PL group received 107 ml/kg fluid in the first 24 hours which was similar to that of NS group where 110 ml/kg fluid was administered (p-value 0.93). They noted a reduced AKI risk (p-value 0.0001) and need for RRT (p-value 0.0002) in the PL group. As our study had small sample size and AKI was a secondary outcome in our study so, our study was not adequately powered to detect difference in

outcome like AKI. Also, fluid volume administered in their study was larger, meaning greater exposure to sodium and chloride containing fluids.

Andrew et al analysed a group of 126 children who were admitted in the 18 month study period and received a fluid bolus within 24 hours duration following admission [44]. They excluded post-surgical patients and those who had undergone hemofiltration. They followed the blood gases and serum creatinine values for 5 days after bolus administration to study plasma chloride as the primary outcome along with other study variables. They found a statistically significant difference average chloride levels (PLA 105.59±1.29 vs NS 111.29 ±2.1 mmol/L; difference: -6.21 [95% confidence interval -9.55,-2.87]) in for the 61-90ml/kg group. Also they noted that children who received PL tended to have a higher pH than those receiving NS. Our study also showed higher chloride levels in NS group but did not reach statistical significance.

Change of serum bicarbonate was studied as a primary outcome in our trial. While studies done by contemporaries like Allen et al, Arya et al and Williams et al revealed a significant rise in value of serum bicarbonate following use of Plasma-Lyte when compared to normal saline; our study showed no difference among the two groups. This lack of a significant change in bicarbonate can possibly be attributed to less mean fluid bolus requirements.

Along with fluid resuscitation, usage of vasopressors is an essential intervention for improving tissue perfusion by elevating mean arterial pressure. Our study suggested that PL when used as a resuscitation fluid in children is associated with a significant reduction in the proportion of patients in need for inotropes which is in coherence with the findings of Arya et al. More studies are required to substantiate this finding as there is a dearth of data comparing the safety and efficacy of different crystalloids in this subset of population. Emrath et al in a large retrospective study done on children with severe sepsis observed that patients in balanced fluid group required fewer days of inotropic support although duration of

inotropic support requirement was found to be similar in both groups in our study [32].

Normal saline contains supra-physiological content of chloride and rapid, large volume of saline when administered was noted to lead to hyperchloremia and subsequent incidence of AKI. As the present study was not powered to detect impact on chloride due to its small sample size and possibly due to infrequent bolus requirements on day 2 and 3 of study period so, no significant hyperchloremia was noted. Also, it seems that rise in chloride is attributable more to increased bicarbonate losses rather than owed to the type of fluid or volume administered. Our study findings turned to be in coherence with a recent study done by Williams et al who noticed that there was a slight increase in chloride levels in both group (although not statistically different) but the same rise didn't translate into increased acute kidney injury incidence [36]. For long time researchers supported a causal link between hyperchloremia and AKI but towards the end of last decade this causal link is being questioned and studies have been showing conflicting results. Honore et al in 2020 rose a statement ''The causal link between hyperchloremia and acute kidney injury is yet to be conclusively established: we are not sure'' [45].

In the present study; median fluid volume administered as boluses in PL group was 20ml/kg and 30ml/kg in NS group. Williams et al in his study on DKA children noted a. volume of 64ml/kg and 68ml/kg in the PL and NS groups respectively [38]. In study done by Jhuma Sankar et al; PL group received 107 ml/kg fluid in the first 24 hours which was similar to that of NS group where 110 ml/kg fluid was administered (p-value 0.93) [36]. This may suggest that the quantity of crystalloid administered could have an impact on the outcomes studied.

A chloride-liberal fluid is expected to cause higher incidence of normal anion gap (hyperchloremic) metabolic acidosis. But our study did not show any difference in the incidence of normal anion gap metabolic acidosis.

We could not find any other study to compare the incidence of normal anion gap metabolic acidosis between balanced and unbalanced fluids.

Studies done on both critically ill as well as non-critically ill adults by various workers have supported the use of balanced crystalloids over unbalanced as their administration appeared to cause reduction in composite outcomes like need for renal replacement, hospital stay duration and mortality. Although there is a paucity of data but pediatric studies done till date comparing PL and NS as initial resuscitation fluid has shown similar results i.e a reduced need for RRT, length of hospital stay, need for ventilation and in hospital mortality although reduction was not found to be statistically significant. Our study also made note of comparable findings except that use of PL in our study showed a significant risk reduction for need for ventilation.

Probably, the reason our study did not detect significant difference in the incidence of adverse outcomes like hyperchloremia, hypernatremia, resolution of metabolic acidosis, acute kidney injury, need for renal replacement, mortality was because of small sample size and lesser amount of cumulative fluid amount received in the form of boluses as both study fluids were used only for the purpose of resuscitation. Therefore, the inference drawn from our study is that when PL and NS were used only as a resuscitation fluid; the incidence of adverse outcomes was comparable.

It is plausible that the overall incidence of metabolic acidosis is determined more by the severity of the underlying cause of metabolic acidosis and the effectiveness of resuscitative measures (fluids and vasoactive agents), and to a lesser extent on the composition of the resuscitation fluid administered.

SUMMARY & CONCLUSION

Our study compared the adverse effect profile of PL and NS in terms of acid-base imbalance and electrolyte disturbance (hypernatremia and hyperchloremia) created by these fluids when these were used for the purpose of fluid resuscitation. We also studied few efficacy measures like impact on ionotropic score, proportion of in-hospital all-cause mortality and length of ICU stay.

We obtained the following results:

- There was no significant difference in the two fluids with respect to the primary outcome i.e change in serum bicarbonate from baseline to 24, 48 and 72 hours.
- The incidence of normal anion gap metabolic acidosis which was similar in the study groups (5% in PL group and 7.5% in NS group at admission while it was 12.5 % and 7.5% at 72 hours in PL and NS groups respectively); which suggested that nature of fluid administered did not have an impact on incidence of normal anion gap metabolic acidosis.
- Although there was slight increase in sodium and chloride in NS group in comparison to PL which is a chloride restrictive fluid but it was not statistically significant.
- It was noted that at 72 hours post resuscitation; 5 out of 17 patients (3 in PL group and 2 in NS group) had progressive or new onset AKI (p-value 0.644) and 11 showed an improvement in their KDIGO score compared to admission (1 patient died before 72 hours). The incidence of AKI was similar in two study arms.
- The proportion of patients requiring inotropes was significantly lower in PL group compared to NS group (p-value 0.013) but the vasoactive inotropic score and duration of inotrope requirement was comparable in the two groups.

- A note was made of less number of patients requiring invasive ventilation in Pl group was statistically significant.
- The incidence of in-hospital all-cause mortality and length of ICU stay was comparable in two groups

CONCLUSION

Our study revealed that when PL and NS were used as a resuscitation fluid; the incidence of metabolic acidosis and electrolyte imbalance was similar. The incidence of new onset and/ or progressive AKI, fluid amount needed for resuscitation, length of hospital stay, need for invasive ventilation and mortality was also comparable among the two groups. We found a significantly lesser proportion of patients in need for inotropes in the PL group. We conclude that resuscitation with PL or NS did not impact the occurrence of acid-base and metabolic imbalance. Larger studies with inclusion of balanced and unbalanced solutions as part of both resuscitation and maintenance fluid would be ideal to see if difference in chloride composition (restricted versus liberal) of crystalloids can contribute significantly to these adverse outcomes.

STRENGTHS OF STUDY

1. Patient screening and enrolment was stringent.
2. There was meticulous monitoring and intention to treat methodology was used for analysis.
3. No previous study has studies incidence of normal anion gap suggesting that the type of fluid doesn't alter anion gap per se.

LIMITATIONS

1. Being a single centre study achieving a large sample size was not large enough to be able to detect a difference in secondary outcomes.
2. The study was unblinded.
3. As study was done on sick children who required resuscitation so, those who died before 72 hours of admission; data was not available for final analysis.

BIBLIOGRAPHY

1. Rudd KE, Johnson SC, Agesa KM, Shackelford KA, Tsoi D, Kievlan DR, et al. Global, regional, and national sepsis incidence and mortality, 1990-2017: analysis for the Global Burden of Disease Study. Lancet. 2020; 395(10219): 200–11.
2. Reddy SK. 0.9% saline versus Plasma-Lyte 148 for intravenous fluid therapy.
3. McFarlane C, Lee A. A comparison of Plasmalyte 148 and 0.9% saline for intra-operative fluid replacement. Anaesthesia. 1994; 49:779-81.
4. Mahler SA, Conrad SA, Wang H, Arnold TC. Resuscitation with balanced electrolyte solution prevents hyperchloremic metabolic acidosis in patients with diabetic ketoacidosis. The American journal of emergency medicine. 2011; 29:670-4.
5. Park M, Calabrich A, Maciel AT, Zampieri FG, Taniguchi LU, Souza CE, et al. Physicochemical characterization of metabolic acidosis induced by normal saline resuscitation of patients with severe sepsis and septic shock. Revista Brasileira de terapia intensiva. 2011; 23:176-82.
6. Verma B, Luethi N, Cioccari L, Lloyd-Donald P, Crisman M, Eastwood G, et al. A multicentre randomised controlled pilot study of fluid resuscitation with saline or Plasma-Lyte 148 in critically ill patients. Crit Care Resusc. 2016;18:205-12.
7. Chua HR, Venkatesh B, Stachowski E, Schneider AG, Perkins K, Ladanyi S, et al. Plasma-Lyte 148 vs 0.9% saline for fluid resuscitation in diabetic ketoacidosis. J Crit Care. 2012;27:138-45.
8. Lehr AR, Rached-d'Astous S, Parker M, McIntyre L, Sampson M, Hamid J, et al. Impact of balanced versus unbalanced fluid resuscitation on clinical outcomes in critically ill children: protocol for a systematic review and meta-analysis. Syst Rev. 2019;8:195

9. MUDGE GH, MANNING JA, GILMAN A. Sodium acetate as a source of fixed base. Proc Soc Exp Biol Med. 1949;71:136-8.
10. Hamada T, Yamamoto M, Nakamaru K, Iwaki K, Ito Y, Koizumi T. The pharmacokinetics of D-lactate, L-lactate and acetate in humans. *Masui.* 1997;46:229–36.
11. Sharma A, Yadav M, Kumar BR, Lakshman PS, Iyenger R, Ramchandran G. A comparative study of Sterofundin and Ringer lactate based infusion protocol in scoliosis correction surgery. Anesth Essays Res. 2016;10:532–7.
12. Young P, Bailey M, Beasley R, Henderson S, Mackle D, McArthur C, et al. Effect of a Buffered Crystalloid Solution vs Saline on Acute Kidney Injury Among Patients in the Intensive Care Unit: The SPLIT Randomized Clinical Trial. JAMA. 2015;314:1701–10.
13. Ngo NT, Cao XT, Kneen R, Wills B, Nguyen VM, Nguyen TQ, et al. Acute management of dengue shock syndrome: a randomized double-blind comparison of 4 intravenous fluid regimens in the first hour. Clin Infect Dis. 2001; 32:204-13.
14. Semler MW, Self WH, Wanderer JP, Ehrenfeld JM, Wang L, Byrne DW, et al; SMART Investigators and the Pragmatic Critical Care Research Group. Balanced Crystalloids versus Saline in Critically Ill Adults. N Engl J Med. 2018;378:829-39.
15. Weiss SL, Peters MJ, Alhazzani W, Agus MSD, Flori HR, Inwald DP, et al. Surviving Sepsis Campaign International Guidelines for the Management of Septic Shock and Sepsis-Associated Organ Dysfunction in Children. Pediatr Crit Care Med. 2020;21:e52–e106.
16. Weiss SL, Balamuth F, Long E, Thompson GC, Hayes KL, Katcoff H, et al; Pragmatic Pediatric Trial of Balanced Versus Normal Saline Fluid in Sepsis (PRoMPT BOLUS) Investigators of the PECARN, PERC, and PREDICT Networks. PRagMatic Pediatric Trial of Balanced vs nOrmaL Saline FlUid in Sepsis: study protocol

for the PRoMPT BOLUS randomized interventional trial. Trials. 2021;22:776.

17. Awad S, Allison SP, Lobo DN. The history of 0.9% saline. Clin Nutr Edinb Scotl 2008; 27:179 – 188.
18. Dillon J, Lynch LJ Jr, Myers R, Butcher HR Jr. The treatment of hemorrhagic shock. Surg Gynecol Obstet. 1966 ;122:967-78.
19. Traverso LW, Lee WP, Langford MJ. Fluid resuscitation after an otherwise fatal hemorrhage: I. Crystalloid solutions. *J Trauma.* 1986;26:168–75.
20. Healey MA, Davis RE, Liu FC, Loomis WH, Hoyt DB. Lactated Ringer's is superior to normal saline in a model of massive hemorrhage and resuscitation. *J Trauma.* 1998;45:894–9.
21. Hack JB, Wilkinson HL. Are the "life-support" courses updated? An evaluation of their literature base. Academic emergency medicine. 2006:580-4.
22. Weinberg, L., Collins, N., Van Mourik, K., Tan, C. & Bellomo, R. (2016). Plasma-Lyte 148: A clinical review.. World J Crit Care Med, 5, pp.235-50.
23. Myburgh JA, Mythen MG. Resuscitation fluids. N Engl J Med 2013; 369:1243-51.
24. Wakim KG. "Normal" 0.9% Salt Solution Is Neither "Normal" Nor Physiological. *JAMA.* 1970; 214:1710.
25. Yunos NM, Bellomo R, Hegarty C, Story D, Ho L, Bailey M. Association between a chloride-liberal vs chloride-restrictive intravenous fluid administration strategy and kidney injury in critically ill adults. JAMA. 2012; 308:1566-72.
26. Scheingraber S, Rehm M, Sehmisch C, Finsterer U. Rapid saline infusion produces hyperchloremic acidosis in patients undergoing gynecologic surgery. Anesthesiology. 1999; 90:1265-70.
27. Shaw AD, Raghunathan K, Peyerl FW, Munson SH, Paluszkiewicz SM, Schermer CR. Association between intravenous chloride load

during resuscitation and in-hospital mortality among patients with SIRS. Intensive Care Med. 2014:1897-905.

28. Marttinen M, Wilkman E, Petäjä L, Suojaranta-Ylinen R, Pettilä V, Vaara ST. Association of plasma chloride values with acute kidney injury in the critically ill–a prospective observational study. Acta anaesthesiologica Scandinavica. 2016; 60:790-9.
29. Ringer S. A further Contribution regarding the influence of the different Constituents of the Blood on the Contraction of the Heart. J Physiol. 1883:29-42.3.
30. White PJ. Alexis F. Hartmann, Sr. J Pediatr. 1964; 64: 783-92.
31. Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJ, Gavaghan DJ, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary?. Controlled clinical trials. 1996; 17:1-2.
32. Emrath ET, Fortenberry JD, Travers C, McCracken CE, Hebbar KB. Resuscitation With Balanced Fluids Is Associated With Improved Survival in Pediatric Severe Sepsis. Crit Care Med. 2017:1177-83.
33. Verma B, Luethi N, Cioccari L, Lloyd-Donald P, Crisman M, Eastwood G, et al. A multicentre, randomised controlled pilot study of fluid resuscitation with saline or Plasma-Lyte 148 in critically ill patients. Critical Care and Resuscitation. 2016:205-12.
34. Allen CH, Goldman RD, Bhatt S, Simon HK, Gorelick MH, Spandorfer PR,et al. A randomized trial of Plasma-Lyte A and 0.9% sodium chloride in acute pediatric gastroenteritis. BMC pediatrics. 2016:1-9.
35. Edwards ED, Mason BW. Plasma-lyte for intravenous fluid maintenance, replacement or resuscitation as an alternative to other intravenous fluids in paediatric patients: A systematic review. J Pedia Health Care Med. 2018; 1:23-6.
36. Sankar J, Muralidharan J, Lalitha AV, RameshKumar R, Karthi N, Subramanian M, et al. 33: Balanced Crystalloids Versus Saline for

Initial Fluid Resuscitation in Children With Septic Shock. Critical Care Medicine. 2021; 49:17.

37. Arya V, Kavitha M, Mittal K, Gehlawat VK. Plasmalyte versus normal saline as resuscitation fluid in children: A randomized controlled trial. J Pediatr Crit Care 2021;8:134-8
38. Williams V, Jayashree M, Nallasamy K, Dayal D, Rawat A. 0.9% saline versus Plasma-Lyte as initial fluid in children with diabetic ketoacidosis (SPinK trial): a double-blind randomized controlled trial. Critical Care. 2020; 24:1-10.
39. Randhawa MS, Revaiah VC, Jayashree M. AHA Pediatric Advanced Life Support Update 2020 - "More Breaths, Less Fluids, and a Focus on Recovery". Indian Pediatr. 2021 Mar 15;58:273-8.
40. FitzSullivan E, Salim A, Demetriades D, Asensio J, Martin MJ. Serum bicarbonate may replace the arterial base deficit in the trauma intensive care unit. *Am J Surg.* 2005; 190:941–6.
41. Martin MJ, FitzSullivan E, Salim A, Berne TV, Towfigh S. Use of Serum Bicarbonate Measurement in Place of Arterial Base Deficit in the Surgical Intensive Care Unit. *Arch Surg.* 2005; 140:745–51.
42. Brubaker RH, Vashisht R, Meseeha M. High anion gap metabolic acidosis. InStatPearls.
43. Stanley FL. Reference Intervals for Laboratory tests and procedures: Kliegman RM, GEME III JWS, Blum NJ, Tasker RC, Shah SS, Wilson KM, et al. Nelson Textbook of Pediatrics. 21th edn. Elsevier; Philadelphia. 2020. p e9-12.
44. Honore PM, Mugisha A, Kugener L, Redant S, Attou R, Gallerani A, De Bels D. The causal link between hyperchloremia and acute kidney injury is yet to be conclusively established: we are not sure. Critical Care. 2020; 24:1-2.
45. Andrew W, Patrick D. P18 Plasma-lyte 148 vs 0.9% saline for fluid resuscition in children: electrolytic and clinical outcome *Archives of Disease in Childhood* 2018;103**:**e1.

SR.NO.	MRD NO	BLOCK No.	Envelope No. in the Block	GROUP	AGE [in years]	AGE [in months]	SEX	DATE of ADMISSION	CITY of RESIDENCE	WEIGHT [kg]	WEIGHT [centiles]	HEIGHT [centimeters]	HEIGHT [centiles]	BMI	CO-MORBIDITIES AT ADMISSION
1	1121421	1	1	NS	0	1	Male	6/11/2021	JALANDHAR	1.4	<3rd	38	<3rd	-	NONE
2	1128962	1	2	NS	2	4	Female	6/28/2021	MOGA	11	3rd - 50th	96	50th - 97th	-	NONE
3	1133738	1	5	PLASMA-LYTE	1	10	Male	7/8/2021	LUDHIANA	10.9	3rd - 50th	82	3rd - 50th	-	NONE
4	1133994	1	3	NS	16	-	Female	7/8/2021	JALANDHAR	60	50th - 97th	165	50th - 97th	22	NONE
5	1135669	1	4	NS	0	5	Male	7/12/2021	LUDHIANA	63	50th - 97th	63	3rd - 50th	-	NONE
6	1136549	1	6	PLASMA-LYTE	0	10	Male	7/13/2021	HOSHIARPUR	9.8	50th - 97th	73	3rd - 50th	-	NONE
7	1137737	1	7	PLASMA-LYTE	9	-	Female	7/16/2021	LUDHIANA	24	3rd - 50th	120	3rd - 50th	16.6	NONE
8	1140495	1	8	PLASMA-LYTE	2	7	Male	7/21/2021	GANGANAGAR, RAJASTHAN	12.3	3rd - 50th	89	3rd - 50th	-	NONE
9	1173215	2	1	PLASMA-LYTE	0	1	Female	9/14/2021	LUDHIANA	3	<3rd	53	3rd - 50th	-	NONE
10	1138247	2	2	NS	3	11	Male	7/16/2021	AMRITSAR	24	>97th	123	>97th	-	NONE
11	1161245	2	3	NS	17	-	Male	8/26/2021	LUDHIANA	52	3rd - 50th	162	3rd - 50th	19.3	NONE
12	1389176	2	4	PLASMA-LYTE	4	-	Male	9/30/2022	JAMMU	18	50th - 97th	102	3rd - 50th	-	NONE
13	1373025	2	5	NS	12	-	Female	9/4/2022	JAMMU	40	50th - 97th	153	50th - 97th	17.09	NONE
14	1396457	2	6	PLASMA-LYTE	11	-	Male	10/12/2022	FEROZPUR	25	3rd - 50th	155	50th - 97th	10.41	NONE
15	1381376	2	7	NS	3	-	Male	9/16/2022	PATIALA	13	3rd - 50th	96	50th - 97th	-	NONE
16	1396480	2	8	PLASMA-LYTE	12	-	Female	10/12/2022	LUDHIANA	24	<3rd	154	50th - 97th	10.12	NONE
17	1164166	3	2	NS	13	-	Male	8/31/2021	KAPURTHALA	24	<3rd	155	3rd - 50th	10.8	NONE
18	485278	3	4	PLASMA-LYTE	7	4	Male	9/14/2021	LUDHIANA	24	50th - 97th	113	3rd - 50th	16.7	Immunosuppression by disease
19	1174725	3	6	PLASMA-LYTE	10	-	Male	9/16/2021	JALANDHAR	50	50th - 97th	146	50th - 97th	23.47	NONE
20	1174830	3	7	NS	0	10	Female	9/17/2021	LUDHIANA	6	<3rd	67	<3rd	-	NONE
21	1175301	3	8	NS	6	-	Female	9/17/2021	LUDHIANA	18	3rd - 50th	114	50th - 97th	14.5	NONE
22	1391357	3	1	NS	15	-	Male	10/3/2022	JALANDHAR	41	3rd - 50th	160	3rd - 50th	16	NONE
23	1399747	3	3	PLASMA-LYTE	5	-	Male	10/19/2022	JALANDHAR	15	3rd - 50th	110	50th - 97th	12.3	NONE
24	26571	3	5	PLASMA-LYTE	11	9	Male	10/19/2022	LUDHIANA	21	<3rd	136	3rd - 50th	11.35	NONE
25	1175446	4	1	PLASMA-LYTE	15	-	Female	9/18/2021	LUDHIANA	36	3rd - 50th	148	3rd - 50th	16.43	NONE
26	1178659	4	4	PLASMA-LYTE	0	1	Male	9/23/2021	LUDHIANA	3.1	<3rd	53	3rd - 50th	-	NONE
27	248202	4	2	PLASMA-LYTE	16	-	Male	9/26/2021	LUDHIANA	40	3rd - 50th	166	3rd - 50th	14.8	NONE
28	1181796	4	3	PLASMA-LYTE	8	-	Male	9/28/2021	HOSHIARPUR	23	3rd - 50th	125	3rd - 50th	14.7	NONE
29	1178877	4	5	NS	16	-	Male	9/23/2021	SAMBA, J&K	51	3rd - 50th	155	3rd - 50th	22.2	NONE
30	1179825	4	6	NS	10	-	Male	9/25/2021	JALANDHAR	30	3rd - 50th	148	50th - 97th	13.7	NONE
31	1396478	4	7	NS	14	-	Male	10/12/2022	MOGA	48	50th - 97th	154	3rd - 50th	20.54	NONE
32	1397549	4	8	NS	8	-	Female	10/14/2022	LUDHIANA	22	3rd - 50th	136	50th - 97th	11.89	NONE
33	1184248	5	1	PLASMA-LYTE	12	-	Male	10/2/2021	JALANDHAR	97	>97th	174	>97th	26.15	NONE
34	1200417	5	2	PLASMA-LYTE	14	-	Female	10/31/2021	HOSHIARPUR	35	3rd - 50th	158	50th - 97th	14	NONE
35	1190783	5	3	NS	12	-	Male	10/13/2021	LUDHIANA	44	50th - 97th	148	3rd - 50th	20.09	NONE
36	1195251	5	4	NS	11	-	Male	10/21/2021	SIRHIND	55	50th - 97th	154	50th - 97th	22.7	NONE
37	1205478	5	5	PLASMA-LYTE	15	-	Male	11/11/2021	JAMMU	40	3rd - 50th	160	3rd - 50th	15.6	NONE
38	1073314	5	6	PLASMA-LYTE	0	8	Female	12/14/2021	LUDHIANA	7	3rd - 50th	70	50th - 97th	-	NONE
39	1197275	5	7	NS	6	9	Female	10/25/2021	JAGRAON	27	50th - 97th	120	50th - 97th	18.75	NONE
40	1220841	5	8	NS	13	-	Male	12/8/2021	PATHANKOT	45	3rd - 50th	153	3rd - 50th	19	NONE
41	1221464	6	1	NS	2	4	Male	12/10/2021	JALANDHAR	9	3rd - 50th	87	3rd - 50th	-	NONE
42	1226970	6	2	PLASMA-LYTE	14	-	Male	12/20/2021	SANGRUR	53	50th - 97th	171	50th - 97th	18.1	NONE
43	1230915	6	3	PLASMA-LYTE	0	2	Female	12/28/2021	MUKTSAR	3.5	<3rd	53	<3rd	-	NONE
44	1234221	6	4	PLASMA-LYTE	4	-	Male	1/4/2022	JALANDHAR	14	3rd - 50th	102	3rd - 50th	-	NONE
45	1233838	6	5	NS	0	5	Male	1/4/2022	MOGA	6	3rd - 50th	62	50th - 97th	-	NONE
46	1234306	6	6	NS	11	-	Female	1/4/2022	LUDHIANA	64	>97th	140	3rd - 50th	32.6	NONE
47	1246837	6	7	PLASMA-LYTE	5	-	Male	1/31/2022	BISHNA,JAMMU	20	50th - 97th	110	50th - 97th	-	NONE
48	1247942	6	8	NS	10	-	Male	2/3/2022	JALANDHA	24	3rd - 50th	145	50th - 97th	11.41	NONE
49	1251417	7	1	NS	6	-	Female	2/10/2022	LUDHIANA	18	3rd - 50th	121	50th - 97th	12.29	NONE
50	1252159	7	2	PLASMA-LYTE	12	-	Male	2/11/2022	LUDHIANA	28	3rd - 50th	151	50th - 97th	12.28	NONE
51	1254598	7	3	PLASMA-LYTE	12	-	Female	2/15/2022	SANGRUR	19	<3rd	137	3rd - 50th	10.12	NONE
52	1256939	7	4	NS	4	-	Male	2/20/2022	NAWANSHEHAR	12	<3rd	99	<3rd	-	NONE
53	1260733	7	5	NS	7	8	Male	2/26/2022	PATIALA	25	50th - 97th	126	50th - 97th	15.75	NONE
54	127661	7	6	PLASMA-LYTE	16	-	Male	3/20/2022	PATIALA	44	3rd - 50th	163	3rd - 50th	16.6	NONE
55	1288157	7	7	NS	3	-	Female	4/15/2022	LUDHIANA	13	50th - 97th	91	3rd - 50th	-	NONE
56	1311673	7	8	PLASMA-LYTE	3	-	Female	5/26/2022	BATHINDA	10	3rd - 50th	93	3rd - 50th	-	NONE
57	875827	8	1	NS	4	7	Female	4/18/2022	LUDHIANA	15	3rd - 50th	100	3rd - 50th	-	Immunosuppression by disease
58	1319260	8	2	PLASMA-LYTE	4	9	Female	6/7/2022	HIMACHAL	14	3rd - 50th	105	50th - 97th	-	NONE
59	1319190	8	3	PLASMA-LYTE	0	9	Female	6/7/2022	LUDHIANA	5	<3rd	68	<3rd	-	NONE
60	1327512	8	4	PLASMA-LYTE	13	1	Female	6/22/2022	LUDHIANA	40	3rd - 50th	155	50th - 97th	16.65	NONE
61	1319189	8	5	NS	0	9	Female	6/7/2022	LUDHIANA	5	<3rd	66	<3rd	-	NONE
62	1323268	8	6	NS	0	4	Female	6/14/2022	LUDHIANA	3.6	<3rd	62	3rd - 50th	-	NONE
63	1278601	8	7	PLASMA-LYTE	1	3	Male	6/27/2022	KANGRA,HIMACHAL	8.4	3rd - 50th	70	3rd - 50th	-	Immunosuppression by disease, Immunosuppression by therapy, Malignancy
64	1325699	8	8	NS	10	9	Male	6/18/2022	LUDHIANA	26	3rd - 50th	114	<3rd	20	NONE

SR.NO.	MRD NO	BLOCK No.	ORAL INTAKE - As deemed by parents [in last 24hrs; compared to usual days]	Type of Oral Fluids/Feeds received	Vomiting	Intravenous fluid administration	Type of IV fluids received [if known]	Urine output	Diarrhea	HR [bpm]	RR [per min]	SBP	DBP	SpO2	CRT [sec]	Temperature [Farenheit]	CP	PP	Severity of Dehydration	Edema
1	1121421	1	Inadequate	-	Yes	Yes	-	Same	No	178	78	86	62	96	<2	103.2	Normal	Bounding	No	Not present
2	1128962	1	Inadequate	Plain water	Yes	No	-	Same	Yes	164	36	106	90	89	<2	99.4	Normal	Normal	No	Not present
3	1133738	1	Inadequate	Plain water	Yes	No	-	Decreased	Yes	162	22	88	64	98	2-3	98	Normal	Normal	Severe	Not present
4	1133994	1	Inadequate	Plain water	Yes	Yes	-	Decreased	No	198	APNEA	80	40	77	>3	98.2	Feeble	Not palpable	No	Present
5	1135669	1	Inadequate	-	No	No	-	Same	Yes	200	48	70	-	97	>3	103	Normal	Normal	No	Not present
6	1136549	1	Inadequate	Plain water	No	No	-	Same	No	178	36	110	78	99	2-3	98	Normal	Normal	No	Not present
7	1137737	1	Inadequate	Plain water	Yes	No	-	Same	No	148	48	102	68	99	2-3	98	Normal	Normal	No	Not present
8	1140495	1	Inadequate	Plain water	No	No	-	Same	No	162	54	98	68	99	<2	100.4	Normal	Normal	No	Not present
9	1173215	2	Inadequate	-	No	No	-	Same	No	184	72	UR	UR	63	2-3	98.4	Normal	Feeble	No	Not present
10	1138247	2	Inadequate	Plain water	Yes	No	-	Same	Yes	126	50	100	44	97	2-3	101	Normal	Bounding	No	Not present
11	1161245	2	Inadequate	Plain water	Yes	No	-	Same	No	138	32	100	60	90	2-3	100.9	Normal	Bounding	No	Not present
12	1389176	2	Inadequate	in water, ORS [Standa	Yes	Yes	NS/DNS	Same	Yes	162	34	80	50	99	<2	98	Normal	Feeble	No	Not present
13	1373025	2	Inadequate	Plain water	Yes	No	-	Same	No	124	28	100	70	96	>3	97	Normal	Feeble	No	Not present
14	1396457	2	Inadequate	Plain water	No	Yes	DNS	Same	No	122	52	72	28	88	>3	97	Normal	Feeble	No	Not present
15	1381376	2	Inadequate	Plain water	No	Yes	-	Same	No	90	APNEA	70	50	99	2-3	98.4	Normal	Feeble	No	Not present
16	1396480	2	Adequate	Plain water	No	No	-	Increased	No	156	42	86	50	96	>3	97	Normal	Feeble	Severe	Not present
17	1164166	3	Adequate	Plain water	Yes	No	-	Increased	No	144	50	130	90	92	2-3	98	Normal	Bounding	Some	Not present
18	485278	3	Inadequate	Plain water	Yes	No	-	Same	No	140	26	120	80	97	2-3	100.2	Normal	Feeble	No	Not present
19	1174725	3	Adequate	Plain water	No	No	-	Same	No	122	24	90	64	97	>3	97	Normal	Feeble	No	Not present
20	1174830	3	Inadequate	Plain water	Yes	No	-	Same	Yes	190	44	UR	UR	98	2-3	104.2	Normal	Not palpable	Some	Not present
21	1175301	3	Inadequate	Plain water	Yes	No	-	Same	No	152	38	94	70	97	2-3	99.8	Normal	Feeble	No	Not present
22	1391357	3	Adequate	Plain water	No	Yes	NS/DNS	Same	No	102	44	110	70	90	<2	97	Normal	Normal	No	Not present
23	1399747	3	Inadequate	Plain water	Yes	No	-	Same	Yes	180	42	100	80	94	>3	98	Normal	Feeble	No	Not present
24	26571	3	Inadequate	Plain water	Yes	No	-	Same	No	146	22	UR	UR	95	>3	97	Normal	Not palpable	No	Not present
25	1175446	4	Adequate	Plain water	No	No	-	Same	No	92	22	90	64	98	<2	98	Normal	Feeble	No	Not present
26	1178659	4	Inadequate	-	No	No	-	Same	Yes	148	64	UR	UR	97	>3	99	Normal	Not palpable	Severe	Not present
27	248202	4	Inadequate	Plain water	Yes	No	-	Same	No	130	40	110	80	100	2-3	97	Normal	Normal	No	Not present
28	1181796	4	Inadequate	Plain water	Yes	No	-	Same	No	82	30	80	40	97	>3	97.4	Normal	Not palpable	No	Not present
29	1178877	4	Inadequate	Plain water	Yes	Yes	-	Same	No	110	26	90	60	98	2-3	101.6	Normal	Normal	No	Not present
30	1179825	4	Inadequate	Plain water	Yes	Yes	-	Same	No	120	42	UR	UR	88	>3	96	Feeble	Not palpable	No	Not present
31	1396478	4	Adequate	Plain water	No	No	-	Same	No	152	36	84	60	99	2-3	97	Normal	Feeble	No	Not present
32	1397549	4	Inadequate	Plain water	Yes	Yes	NS/DNS	Same	No	156	32	80	60	99	>3	97	Normal	Feeble	No	Not present
33	1184248	5	Inadequate	Plain water	Yes	No	-	Same	No	122	20	126	92	98	2-3	98	Normal	Normal	No	Not present
34	1200417	5	Inadequate	Plain water	No	No	-	Same	No	138	36	100	60	86	<2	97	Normal	Normal	No	Not present
35	1190783	5	Inadequate	Plain water	Yes	No	-	Same	Yes	128	24	90	60	96	2-3	98	Normal	Feeble	No	Not present
36	1195251	5	Inadequate	Plain water	Yes	No	-	Same	No	98	28	80	-	97	>3	96	Normal	Feeble	No	Not present
37	1205478	5	Inadequate	Plain water	Yes	No	-	Same	No	146	20	120	60	99	<2	97	Normal	Bounding	No	Not present
38	1073314	5	Inadequate	Plain water	No	No	-	Same	Yes	150	68	90	50	92	>3	98.6	Normal	Feeble	Severe	Not present
39	1197275	5	Inadequate	in water, ORS [Standa	Yes	No	-	Same	No	134	40	UR	UR	98	2-3	98	Normal	Not palpable	No	Not present
40	1220841	5	Inadequate	Plain water	Yes	No	-	Same	Yes	120	40	70	40	95	>3	97	Normal	Not palpable	No	Not present
41	1221464	6	Inadequate	Plain water	Yes	No	-	Same	No	192	44	90	60	98	<2	101.8	Normal	Normal	No	Not present
42	1226970	6	Inadequate	Plain water	Yes	No	-	Same	No	112	36	UR	UR	UR	>3	95	Normal	Not palpable	No	Not present
43	1230915	6	Inadequate	-	Yes	No	-	Same	No	186	66	76	40	96	<2	98.2	Normal	Bounding	No	Present
44	1234221	6	Inadequate	Plain water	No	No	-	Same	Yes	156	68	82	42	78	>3	98	Normal	Normal	No	Not present
45	1233838	6	Inadequate	-	Yes	Yes	N/2DS	Same	Yes	154	58	UR	UR	90	>3	98	Normal	Feeble	Severe	Not present
46	1234306	6	Inadequate	Plain water	Yes	No	-	Same	No	144	28	UR	UR	98	>3	97	Normal	Not palpable	No	Not present
47	1246837	6	Inadequate	Plain water	No	Yes	-	Same	No	178	38	98	60	94	<2	102.4	Normal	Bounding	No	Not present
48	1247942	6	Inadequate	Plain water	Yes	No	-	Same	Yes	124	22	88	52	98	<2	98.2	Normal	Not palpable	No	Not present
49	1251417	7	Inadequate	Plain water	Yes	No	-	Decreased	No	160	24	80	50	96	>3	97	Normal	Feeble	No	Not present
50	1252159	7	Inadequate	Plain water	No	Yes	-	Same	No	110	APNEA	100	36	84	>3	96.4	Normal	Bounding	No	Not present
51	1254598	7	Adequate	Plain water	No	No	-	Increased	No	138	28	130	100	100	<2	98.4	Normal	Normal	No	Not present
52	1256939	7	Adequate	Plain water	No	No	-	Same	No	138	38	78	36	77	>3	96	Normal	Feeble	No	Not present
53	1260733	7	Adequate	Plain water	No	No	-	Same	No	138	26	UR	UR	98	>3	92	Feeble	Not palpable	No	Present
54	127661	7	Inadequate	Plain water	Yes	No	-	Same	No	136	38	110	70	94	<2	97	Normal	Normal	Severe	Not present
55	1288157	7	Inadequate	Plain water	No	No	-	Same	No	188	52	60	40	70	>3	101.4	Normal	Feeble	No	Not present
56	1311673	7	Inadequate	Plain water	No	No	-	Same	No	168	68	100	60	68	<2	98.4	Normal	Bounding	No	Not present
57	875827	8	Inadequate	Plain water	Yes	Yes	-	Same	No	108	APNEA	UR	UR	94	>3	92	Feeble	Not palpable	Some	Not present
58	1319260	8	Adequate	Plain water	No	No	-	Increased	No	168	APNEA	100	60	60	2-3	98	Normal	Normal	No	Not present
59	1319190	8	Inadequate	Plain water	Yes	No	-	Same	Yes	176	26	90	60	99	2-3	97.4	Normal	Normal	Some	Not present
60	1327512	8	Adequate	-	No	No	-	Same	No	170	24	120	70	94	2-3	98.4	Normal	Normal	No	Not present
61	1319189	8	Inadequate	Plain water	Yes	No	-	Same	Yes	160	28	90	60	98	2-3	98	Normal	Normal	Some	Not present
62	1323268	8	Inadequate	-	No	Yes	-	Decreased	No	182	APNEA	76	48	99	<2	100.8	Normal	Normal	No	Not present
63	1278601	8	Inadequate	in water, ORS [Standa	No	No	-	Same	No	185	40	90	60	96	<2	103.4	Normal	Bounding	No	Not present
64	1325699	8	Adequate	Plain water	No	No	-	Same	No	148	54	120	60	99	<2	101	Normal	Bounding	No	Not present

SR.NO.	MRD NO	BLOCK No.	PREDOMINANT SYSTEM INVOLVED	PRISM III SCORE AT ADMISSION	FINAL PHYSIOLOGICAL IMPRESSION	COMPENSATED SHOCK	Resuscitation fluid [Day 1 - ml/kg]	Resuscitation fluid [Day 2 - ml/kg]
1	1121421	1	Respiratory, Gastro-intestinal, Sepsis	19	Respiratory distress	No	10	10
2	1128962	1	Gastro-intestinal	23	Respiratory distress, Compensated shock	Yes	10	-
3	1133738	1	Gastro-intestinal, Metabolic	18	Compensated shock	Yes	30	-
4	1133994	1	Cardiovascular, Respiratory, Gastro-intestinal, Neurological, Sepsis, Metabolic, Hematological	39	Respiratory failure, Hypotensive shock, Primary brain/Metabolic dysfunction	No	30	-
5	1135669	1	Cardiovascular, Respiratory, Gastro-intestinal, Sepsis	6	Respiratory distress, Compensated shock	Yes	20	-
6	1136549	1	Cardiovascular, Respiratory	21	Respiratory distress, Compensated shock	Yes	10	-
7	1137737	1	Cardiovascular, Respiratory, Gastro-intestinal, Sepsis, Metabolic	3	Respiratory distress, Compensated shock, Primary brain/Metabolic dysfunction	Yes	10	-
8	1140495	1	Cardiovascular, Respiratory, Metabolic	11	Respiratory distress, Compensated shock	Yes	20	-
9	1173215	2	Cardiovascular, Respiratory, Sepsis, Metabolic	19	Respiratory failure, Hypotensive shock	No	10	-
10	1138247	2	Cardiovascular, Respiratory, Gastro-intestinal, Sepsis, Metabolic	2	Respiratory distress, Compensated shock	Yes	30	10
11	1161245	2	Respiratory, Gastro-intestinal, Sepsis, Metabolic	7	Respiratory distress, Compensated shock	Yes	30	10
12	1389176	2	Gastro-intestinal, Neurological	8	Compensated shock, Primary brain/Metabolic dysfunction	Yes	10	-
13	1373025	2	Cardiovascular, Gastro-intestinal, Sepsis	7	Compensated shock	Yes	50	-
14	1396457	2	Respiratory, Sepsis	11	Respiratory distress, Hypotensive shock	No	30	20
15	1381376	2	Neurological	15	Hypotensive shock, Primary brain/Metabolic dysfunction	No	30	-
16	1396480	2	Respiratory, Sepsis, Metabolic	18	Respiratory distress, Hypotensive shock	No	20	-
17	1164166	3	Respiratory, Sepsis, Metabolic	14	Respiratory distress, Compensated shock, Primary brain/Metabolic dysfunction	Yes	20	-
18	485278	3	Gastro-intestinal, Hematological	8	Compensated shock	Yes	20	-
19	1174725	3	Cardiovascular	16	Hypotensive shock	No	10	-
20	1174830	3	Respiratory, Gastro-intestinal, Neurological, Sepsis, Metabolic	22	Respiratory distress, Hypotensive shock, Primary brain/Metabolic dysfunction	No	60	20
21	1175301	3	Cardiovascular, Gastro-intestinal	1	Compensated shock	Yes	30	-
22	1391357	3	Respiratory	1	Respiratory failure	No	10	-
23	1399747	3	Cardiovascular, Respiratory, Gastro-intestinal, Sepsis	7	Respiratory distress, Hypotensive shock	No	20	-
24	26571	3	Cardiovascular, Sepsis	7	Hypotensive shock	No	30	-
25	1175446	4	Gastro-intestinal	9	Hypotensive shock, Primary brain/Metabolic dysfunction	No	30	-
26	1178659	4	Cardiovascular, Respiratory, Gastro-intestinal, Metabolic	15	Respiratory distress, Hypotensive shock	No	50	-
27	248202	4	Respiratory, Sepsis, Metabolic	11	Respiratory distress, Compensated shock, Primary brain/Metabolic dysfunction	Yes	10	-
28	1181796	4	Cardiovascular, Metabolic	11	Hypotensive shock	No	20	-
29	1178877	4	Cardiovascular	1	Hypotensive shock	No	10	-
30	1179825	4	Cardiovascular, Respiratory, Gastro-intestinal, Neurological, Metabolic	26	Respiratory failure, Hypotensive shock	No	40	-
31	1396478	4	Sepsis	6	Respiratory distress, Hypotensive shock	No	20	-
32	1397549	4	Cardiovascular, Metabolic	6	Respiratory distress, Hypotensive shock	No	50	20
33	1184248	5	Cardiovascular, Metabolic	16	Compensated shock	Yes	10	-
34	1200417	5	Respiratory, Metabolic	6	Respiratory distress, Compensated shock	Yes	10	-
35	1190783	5	Cardiovascular, Gastro-intestinal	20	Hypotensive shock	No	20	-
36	1195251	5	Cardiovascular, Respiratory, Gastro-intestinal	18	Respiratory distress, Compensated shock	Yes	20	-
37	1205478	5	Gastro-intestinal, Sepsis	7	Compensated shock	Yes	30	-
38	1073314	5	Cardiovascular, Gastro-intestinal, Sepsis, Metabolic	5	Respiratory failure, Compensated shock	Yes	10	-
39	1197275	5	Cardiovascular, Respiratory, Gastro-intestinal	12	Respiratory distress, Hypotensive shock	No	30	-
40	1220841	5	Sepsis, Metabolic	4	Hypotensive shock	No	20	-
41	1221464	6	Cardiovascular, Neurological, Trauma	14	Hypotensive shock	No	20	30
42	1226970	6	Gastro-intestinal	21	Hypotensive shock	No	20	-
43	1230915	6	Gastro-intestinal, Sepsis, Metabolic	5	Respiratory distress, Compensated shock	Yes	20	30
44	1234221	6	Respiratory, Gastro-intestinal, Sepsis, Trauma	15	Respiratory distress, Compensated shock	Yes	10	-
45	1233838	6	Gastro-intestinal, Sepsis	7	Respiratory distress, Compensated shock	Yes	60	-
46	1234306	6	Cardiovascular, Gastro-intestinal, Sepsis	21	Hypotensive shock	No	40	20
47	1246837	6	Respiratory, Sepsis	19	Compensated shock	Yes	10	50
48	1247942	6	Gastro-intestinal, Sepsis	3	Hypotensive shock	No	40	-
49	1251417	7	Cardiovascular, Gastro-intestinal, Sepsis	11	Hypotensive shock	No	40	-
50	1252159	7	Respiratory, Gastro-intestinal, Sepsis	16	Respiratory failure, Compensated shock	Yes	50	-
51	1254598	7	Metabolic	12	Compensated shock, Primary brain/Metabolic dysfunction	Yes	10	-
52	1256939	7	Cardiovascular, Respiratory, POISONING	10	Respiratory failure, Hypotensive shock	No	20	-
53	1260733	7	Cardiovascular, Trauma, BURNS	26	Hypotensive shock	No	40	20
54	127661	7	Respiratory, Metabolic	11	Compensated shock, Primary brain/Metabolic dysfunction	Yes	10	-
55	1288157	7	Gastro-intestinal, Sepsis	20	Respiratory failure, Hypotensive shock	No	30	-
56	1311673	7	Respiratory, Sepsis	9	Respiratory failure, Compensated shock	Yes	10	20
57	875827	8	Cardiovascular, Respiratory, Sepsis, Metabolic	25	Respiratory failure, Hypotensive shock	No	30	-
58	1319260	8	Respiratory, Metabolic	13	Respiratory failure, Compensated shock, Primary brain/Metabolic dysfunction	Yes	10	-
59	1319190	8	Gastro-intestinal, Sepsis	16	Compensated shock	Yes	10	-
60	1327512	8	SNAKE ENVENOMATION	20	Respiratory distress, Compensated shock	Yes	30	-
61	1319189	8	Gastro-intestinal, Sepsis	13	Compensated shock	Yes	10	10
62	1323268	8	Respiratory, Metabolic	24	Respiratory failure, Compensated shock	Yes	20	10
63	1278601	8	Sepsis	5	Compensated shock	Yes	10	10
64	1325699	8	Cardiovascular, Sepsis	4	Respiratory distress, Compensated shock	Yes	20	-

SR.NO.	MRD NO	BLOCK No.	Resuscitation fluid [Day 3 - ml/kg]	Resuscitation fluid administered in 3 days [ml/kg]	Other fluids : Na (Meq/Kg)	Other fluids Cl (Meq/Kg)	Other fluids HCO3 (Meq/Kg)	Serum HCO3 value [at admission]	Serum HCO3 value [at 24 hours]	Serum HCO3 value [at 48 hours]	Serum HCO3 value [at 72 hours]	Lowest HC03 value	Diff Serum HCO3 value [at 24 hours]	Diff Serum HCO3 value [at 48 hours]	Diff Serum HCO3 value [at 72 hours]	Serum Na value [at admission]	Serum Na value [at 24 hours]	Serum Na value [at 48 hours]	Serum Na value [at 72 hours]	Highest Na value	Diff Serum Na value [at 24 hours]	Diff Serum Na value [at 48 hours]
1	1121421	1	-	20	-	-	-	29.3	25.4	22.5	20.6	20.6	3.9	6.8	8.7	139	140	139	137	140	1	0
2	1128962	1	-	10	-	-	-	18.8	22.8	25.3	26.4	18.8	-4	-6.5	-7.6	138	142	141	142	142	4	3
3	1133738	1	-	30	4.2	4.2	-	14.5	13.7	16	-	13.7	0.8	-1.5	-	131	138	141	-	141	7	10
4	1133994	1	-	-	2.52	1.69	0.83	9.9	-	-	-	-	-	-	-	148	-	-	-	-	-	-
5	1135669	1	-	20	9.6	12.2	-	20.5	21.4	23.1	30.1	20.5	-0.9	-2.6	-9.6	140	134	139	134	140	-6	-1
6	1136549	1	-	10	2.09	2.09	-	20.9	-	-	-	-	-	-	-	145	-	-	-	-	-	-
7	1137737	1	-	-	22.9	22.9	-	3.3	11.3	17.8	23.5	3.3	-8	-14.5	-20.2	134	137	138	131	138	3	4
8	1140495	1	-	20	19.4	22	-	24.1	24.3	25	28.7	24.1	-0.2	-0.9	-4.6	142	146	147	150	150	4	5
9	1173215	2	-	-	7.44	7.44	-	23.4	-	-	-	-	-	-	-	132	-	-	-	-	-	-
10	1138247	2	-	40	16.4	18.4	-	23.9	22.5	26.6	25.8	22.5	1.4	-2.7	-1.9	134	139	138	148	148	5	4
11	1161245	2	-	40	17.2	17.2	-	24.7	24.6	-	-	24.6	0.1	-	-	143	141	140	-	143	-2	-3
12	1389176	2	-	10	6.72	6.72	-	25.9	20.5	26.2	26.5	20.5	5.4	-0.3	-0.6	153	151	158	150	158	-2	5
13	1373025	2	-	50	14.89	16.74	-	20.9	28.1	31.2	30.2	20.9	-7.2	-10.3	-9.3	130	140	141	142	142	10	11
14	1396457	2	-	50	24.02	24.02	-	26.6	29.7	-	-	26.6	-3.1	-	-	146	148	-	-	148	2	-
15	1381376	2	-	30	15.6	22.1	-	23.1	25.8	30.2	30.1	23.1	-2.7	-7.1	-7	156	157	155	153	157	1	-1
16	1396480	2	-	20	44.01	47.59	-	0	12	13.4	17	0	-12	-13.4	-17	138	152	148	145	152	14	10
17	1164166	3	-	20	26.88	29.88	-	0	9.7	16.9	21.5	0	-9.7	-16.9	-21.5	136	137	138	135	138	1	2
18	485278	3	-	20	23.1	23.1	-	19.8	22.4	23.2	24.1	19.8	-2.6	-3.4	-4.3	129	134	134	135	135	5	5
19	1174725	3	-	10	23.4	23.4	-	20	19.1	23.1	24	19.1	0.9	-3.1	-4	136	132	141	141	141	-4	5
20	1174830	3	-	80	43.21	43.31	4	10.6	17.4	21.3	27.2	10.6	-6.8	-10.7	-16.6	149	153	143	143	153	4	-6
21	1175301	3	-	30	24.2	24.2	-	18.2	19.2	26.3	-	18.2	-1	-8.1	-	131	-	141	-	-	-	10
22	1391357	3	-	10	28.5	26.8	1.7	26.2	27.1	34.7	35.7	26.2	-0.9	-8.5	-9.5	139	143	144	142	144	4	5
23	1399747	3	-	20	19.4	25	-	20.9	22.9	28.2	26.2	20.9	-2	-7.3	-5.3	135	-	138	136	138	-	3
24	26571	3	-	30	24.3	26.96	-	15.7	21.4	29.6	36.7	15.7	-5.7	-13.9	-21	137	138	138	140	137	1	1
25	1175446	4	-	30	4.44	4.44	-	24.3	24.8	25	-	24.3	-0.5	-0.7	-	138	141	141	-	141	3	3
26	1178659	4	-	50	53.68	35.38	24.1	3.5	7.4	12.9	15.1	3.5	-3.9	-9.4	-11.6	142	142	147	147	147	0	5
27	248202	4	-	10	25.9	29.25	-	4.2	17.1	-	-	4.2	-12.9	-	-	137	132	134	135	137	-5	-3
28	1181796	4	-	20	34.2	34.2	-	26.6	24.2	-	-	24.2	2.4	-	-	134	140	139	140	140	6	5
29	1178877	4	-	10	19.21	19.21	-	24.4	-	-	28.1	24.4	-	-	-3.7	131	135	137	141	141	4	6
30	1179825	4	-	40	2.2	2.2	-	9.4	-	-	-	-	-	-	-	133	-	-	-	-	-	-
31	1396478	4	-	20	12.6	12.6	-	18.4	25.9	26.7	27.1	18.4	-7.5	-8.3	-8.7	136	137	137	131	131	1	1
32	1397549	4	-	70	16.6	21.8	-	18.4	20.7	23.1	30.9	18.4	-2.3	-4.7	-12.5	132	140	142	142	142	8	10
33	1184248	5	-	10	13.171	13.17	-	21.7	-	-	28.7	21.7	-	-	-7	136	-	-	139	139	-	-
34	1200417	5	-	10	6.38	6.38	-	16.4	19	21.1	25.6	16.4	-2.6	-4.7	-9.2	132	133	148	148	148	1	16
35	1190783	5	-	20	26.7	26.7	-	24.4	-	19.8	-	19.8	-	4.6	-	125	140	141	141	141	15	16
36	1195251	5	-	20	26.4	26.4	-	24	29.2	23.2	-	23.2	-5.2	0.8	-	128	139	140	-	140	11	12
37	1205478	5	-	30	12.92	9.62	3.3	24	14	25.1	27.7	14	10	-1.1	-3.7	141	149	151	161	161	8	10
38	1073314	5	-	10	15.67	12.1	3.57	4	10	14.4	14.8	4	-6	-10.4	-10.8	167	150	154	152	167	-17	-13
39	1197275	5	-	30	39.5	39.5	-	22	25.4	27.5	26.9	22	-3.4	-5.5	-4.9	147	138	135	137	135	-9	-12
40	1220841	5	-	20	14.4	14.4	-	20.2	18.3	14.4	21.4	18.3	1.9	5.8	-1.2	130	133	143	147	147	3	13
41	1221464	6	-	50	26.44	25.33	4.88	8	20	23.6	25.9	8	-12	-15.6	-17.9	150	162	155	140	162	12	5
42	1226970	6	-	20	16.2	1.69	-	12.5	18.1	18.9	21.5	12.5	-5.6	-6.4	-9	141	138	138	142	142	-3	-3
43	1230915	6	10	60	39.58	39.58	-	18.6	11	16	19.3	11	7.6	2.6	-0.7	125	125	119	119	119	0	-6
44	1234221	6	-	-	32.01	32.01	-	25.3	30.6	21.1	26.9	21.1	-5.3	4.2	-1.6	145	144	138	140	145	-1	-7
45	1233838	6	-	60	21.87	3	9.3	8.2	20.2	21.3	-	8.2	-12	-13.1	-	156	162	158	149	162	6	2
46	1234306	6	-	50	13.88	13.88	-	11.5	19.6	18.9	26.3	11.5	-8.1	-7.4	-14.8	126	139	144	149	149	13	18
47	1246837	6	-	60	9.04	9.04	-	20.5	21.4	-	-	20.5	-0.9	-	-	147	152	-	-	155	5	-
48	1247942	6	-	40	30.83	30.83	-	17	20	22	21	17	-3	-5	-4	120	124	135	136	136	4	15
49	1251417	7	10	50	34.31	34.31	-	19.1	20.5	21.5	19.1	19.1	-1.4	-2.4	0	134	145	144	143	145	11	10
50	1252159	7	-	50	21.01	26.71	-	23.2	34.5	33.4	33.2	23.2	-11.3	-10.2	-10	141	148	148	151	151	7	7
51	1254598	7	-	10	47.31	51.51	-	0	11	14.1	31.9	0	-11	-14.1	-31.9	150	151	140	140	151	1	-10
52	1256939	7	-	20	24.3	24.3	-	17.7	21.4	23	26.1	17.7	-3.7	-5.3	-8.4	137	141	144	142	144	4	7
53	1260733	7	-	-	46.3	46.02	5	3.2	13.9	20.9	25.6	3.2	-10.7	-17.7	-22.4	146	143	141	137	146	-3	-5
54	127661	7	-	10	8.47	9.69	-	0	10	18.6	23.6	0	-10	-18.6	-23.6	133	144	142	135	144	11	9
55	1288157	7	-	30	17.87	17.11	0.76	10.5	17.4	25	27	10.5	-6.9	-14.5	-16.5	129	131	140	141	141	2	11
56	1311673	7	10	40	14.32	12.32	2	18.9	23.9	21.6	-	18.9	-5	-2.7	-	131	135	130	-	135	4	-1
57	875827	8	-	30	26.2	25.4	2.8	11.5	10.7	8.7	8.2	8.2	0.8	2.8	3.3	133	166	165	157	166	33	32
58	1319260	8	-	10	26.47	26.47	-	16.5	19.7	18.9	26.6	16.5	-3.2	-2.4	-10.1	144	153	150	149	153	9	6
59	1319190	8	-	10	25.56	28.76	-	10.6	13.2	15.7	16.6	10.6	-2.6	-5.1	-6	139	136	137	-	139	-3	-2
60	1327512	8	-	30	8.47	13.52	-	23.9	26.1	26.3	24.5	23.9	-2.2	-2.4	-0.6	142	131	131	132	142	-11	-11
61	1319189	8	-	20	40.3	40.8	-	17.6	12.3	10.3	15.4	10.3	5.3	7.3	2.2	130	137	134	139	139	7	4
62	1323268	8	30	60	19.66	16.05	7.77	9.2	14.4	22.3	25.2	9.2	-5.2	-13.1	-16	137	152	159	158	159	15	22
63	1278601	8	-	20	29.15	31.75	-	24.3	21.4	23.7	26.8	21.4	2.9	0.6	-2.5	137	137	137	140	140	0	0
64	1325699	8	-	20	8.55	9.39	-	26.3	24.8	24.4	26.7	24.4	1.5	1.9	-0.4	132	133	131	131	33	1	-1

SR.NO.	MRD NO	BLOCK No.	Diff Serum Na value [at 72 hours]	Serum Cl value [at admission]	Serum Cl value [at 24 hours]	Serum Cl value [at 48 hours]	Serum Cl value [at 72 hours]	Peak Cl value	diff Serum Cl value [at 24 hours]	diff Serum Cl value [at 48 hours]	diff Serum Cl value [at 72 hours]	Serum Creatinine value [at admission]	Serum Creatinine value [at 24 hours]	Serum Creatinine value [at 48 hours]	Serum Creatinine value [at 72 hours]	Peak Creatinine value	diff Serum Creatinine value [at 24 hours]	diff Serum Creatinine value [at 48 hours]	diff Serum Creatinine value [at 72 hours]	pH value [at admission]	pH value [at 24 hours]	pH value [at 48 hours]
1	1121421	1	-2	104	109	110	111	111	-5	-6	-7	0.19	0.14	0.15	0.15	0.19	0.05	0.04	0.04	7.6	7.38	7.51
2	1128962	1	4	103	109	108	107	109	-6	-5	-4	0.28	0.28	0.17	0.17	0.28	0	0.11	0.11	7.34	7.37	7.35
3	1133738	1	-	101	113	117	-	117	-12	-16	-	0.84	0.35	0.26	-	0.84	0.49	0.58	-	7.26	7.25	7.33
4	1133994	1	-	116	-	-	-	-	-	-	-	2.31	-	-	-	-	-	-	-	7.04	-	-
5	1135669	1	-6	101	107	113	99	113	-6	-12	2	0.36	0.3	0.18	0.13	0.36	0.06	0.18	0.23	7.39	7.37	7.36
6	1136549	1	-	110	-	-	-	-	-	-	-	0.22	-	-	-	-	-	-	-	7.24	-	-
7	1137737	1	-3	102	112	106	97	112	-10	-4	5	0.8	0.37	0.35	0.31	0.8	0.43	0.45	0.49	6.89	6.85	7.11
8	1140495	1	8	103	111	114	114	114	-8	-11	-11	0.27	0.26	0.24	0.22	0.27	0.01	0.03	0.05	7.27	7.33	7.37
9	1173215	2	-	99	-	-	-	-	-	-	-	0.23	-	-	-	-	-	-	-	7.34	-	-
10	1138247	2	14	103	110	111	115	115	-7	-8	-12	0.29	0.34	0.41	0.38	0.41	-0.05	-0.12	-0.09	7.45	7.36	7.36
11	1161245	2	-	107	107	104	-	107	0	3	-	0.71	0.6	-	-	0.71	0.11	-	-	7.41	7.36	-
12	1389176	2	-3	115	124	123	114	124	-9	-8	1	0.24	0.23	0.16	0.41	0.41	0.01	0.08	-0.17	7.42	7.54	7.44
13	1373025	2	12	99	103	103	108	108	-4	-4	-9	0.88	0.45	0.43	0.47	0.88	0.43	0.45	0.41	7.35	7.49	7.5
14	1396457	2	-	98	104	-	-	104	-6	-	-	0.89	2.3	-	-	3.8	-1.41	-	-	7.36	7.5	-
15	1381376	2	-3	123	120	123	114	123	3	0	9	0.35	0.29	0.24	0.33	0.35	0.06	0.11	0.02	7.56	7.41	7.53
16	1396480	2	7	102	128	122	118	152	-26	-20	-16	0.7	0.76	0.82	0.73	0.82	-0.06	-0.12	-0.03	6.85	7.2	7.36
17	1164166	3	-1	98	111	111	105	11	-13	-13	-7	0.76	0.64	0.41	0.28	0.76	0.12	0.35	0.48	6.91	7.22	7.32
18	485278	3	6	88	103	105	106	106	-15	-17	-18	0.47	0.21	0.2	0.2	0.47	0.26	0.27	0.27	7.38	7.41	7.44
19	1174725	3	5	103	108	108	103	108	-5	-5	0	0.43	0.35	0.33	0.32	0.43	0.08	0.1	0.11	7.43	7.49	7.54
20	1174830	3	-6	114	125	112	114	125	-11	2	0	0.98	0.28	0.19	0.17	0.98	0.7	0.79	0.81	7.19	7.36	7.36
21	1175301	3	-	97	-	108	-	108	-	-11	-	0.33	-	0.19	-	0.33	-	0.14	-	7.52	7.48	7.49
22	1391357	3	3	102	102	103	97	103	0	-1	5	0.56	0.56	0.48	0.49	0.56	0	0.08	0.07	7.38	7.25	7.33
23	1399747	3	1	104	-	104	106	106	-	0	-2	0.31	-	0.4	0.36	0.4	-	-0.09	-0.05	7.51	7.45	7.53
24	26571	3	3	107	113	97	101	113	-6	10	6	0.65	0.39	0.42	0.36	0.65	0.26	0.23	0.29	7.27	7.4	7.49
25	1175446	4	-	108	107	107	-	108	1	1	-	0.47	0.39	0.35	-	0.47	0.08	0.12	-	7.43	7.4	7.39
26	1178659	4	5	120	124	128	123	128	-4	-8	-3	0.38	0.45	0.45	0.42	0.45	-0.07	-0.07	-0.04	6.87	7.18	7.3
27	248202	4	-2	97	106	102	101	106	-9	-5	-4	0.98	-	-	-	-	-	-	-	6.91	7.36	-
28	1181796	4	6	102	105	105	105	105	-3	-3	-3	0.38	0.33	0.39	0.32	0.39	0.05	-0.01	0.06	7.44	7.53	-
29	1178877	4	10	98	106	103	105	106	-8	-5	-7	0.68	0.66	0.68	0.63	0.68	0.02	0	0.05	7.46	-	-
30	1179825	4	-	98	-	-	-	-	-	-	-	1.2	-	-	-	-	-	-	-	6.99	-	-
31	1396478	4	-5	96	104	102	98	96	-8	-6	-2	0.85	0.93	0.36	0.42	0.93	-0.08	0.49	0.43	7.19	7.45	7.45
32	1397549	4	10	93	114	109	105	114	-21	-16	-12	0.77	0.42	0.49	0.48	0.77	0.35	0.28	0.29	7.31	7.32	7.43
33	1184248	5	3	101	-	-	105	105	-	-	-4	0.82	-	-	0.35	0.82	-	-	0.47	7.5	-	-
34	1200417	5	16	101	104	118	120	120	-3	-17	-19	1.4	1.08	0.62	0.59	1.4	0.32	0.78	0.81	7.34	7.3	7.4
35	1190783	5	16	89	112	111	108	112	-23	-22	-19	0.7	0.58	0.5	0.45	0.7	0.12	0.2	0.25	7.47	-	7.37
36	1195251	5	-	91	108	105	-	108	-17	-14	-	0.57	0.34	0.37	-	0.57	0.23	0.2	-	7.42	7.44	7.43
37	1205478	5	20	107	117	120	134	134	-10	-13	-27	0.68	1.69	2.02	1.28	2.02	-1.01	-1.34	-0.6	7.44	7.38	7.42
38	1073314	5	-15	141	124	123	125	141	17	18	16	1.66	1.94	2.57	2.46	2.57	-0.28	-0.91	-0.8	7.03	6.96	7.2
39	1197275	5	-10	111	108	105	108	111	3	6	3	0.94	0.82	0.71	0.61	0.94	0.12	0.23	0.33	7.37	7.47	7.5
40	1220841	5	17	99	107	112	124	124	-8	-13	-25	1.11	1.01	1	0.85	1.11	0.1	0.11	0.26	7.36	7.28	7.29
41	1221464	6	-10	117	129	123	109	129	-12	-6	8	1.13	1.39	1.57	1.81	1.81	-0.26	-0.44	-0.68	7.21	7.24	7.29
42	1226970	6	1	106	108	108	106	108	-2	-2	0	1.33	1.32	2.66	4.8	4.8	0.01	-1.33	-3.47	7.21	7.36	7.38
43	1230915	6	-6	96	94	97	91	97	2	-1	5	0.2	0.44	1.16	1.23	1.23	-0.24	-0.96	-1.03	7.34	7.29	7.13
44	1234221	6	-5	113	112	102	109	113	1	11	4	0.18	0.1	0.15	0.15	0.18	0.08	0.03	0.03	7.37	7.44	7.35
45	1233838	6	-7	130	130	123	116	130	0	7	14	0.82	0.55	0.4	0.32	0.82	0.27	0.42	0.5	7.29	7.47	7.46
46	1234306	6	23	93	111	110	114	114	-18	-17	-21	0.71	1.02	0.6	0.57	1.02	-0.31	0.11	0.14	7.15	7.32	7.32
47	1246837	6	-	114	122	-	-	123	-8	-	-	0.51	0.55	-	-	0.56	-0.04	-	-	7.35	7.3	-
48	1247942	6	16	87	92	103	105	105	-5	-16	-18	1.01	0.75	0.62	0.42	1.01	0.26	0.39	0.59	7.34	7.36	7.37
49	1251417	7	9	100	114	115	115	115	-14	-15	-15	0.51	0.47	0.54	0.57	0.57	0.04	-0.03	-0.06	7.32	7.3	7.26
50	1252159	7	10	103	101	108	108	108	2	-5	-5	0.49	0.67	0.61	0.42	0.67	-0.18	-0.12	0.07	7.45	7.54	7.47
51	1254598	7	-10	110	121	102	100	121	-11	8	10	1.01	0.57	0.34	0.35	1.01	0.44	0.67	0.66	6.82	7.18	7.34
52	1256939	7	5	104	113	109	103	113	-9	-5	1	0.41	-	0.27	0.28	0.41	-	0.14	0.13	7.31	7.36	7.44
53	1260733	7	-9	117	126	115	104	126	-9	2	13	0.56	0.73	0.62	0.36	0.73	-0.17	-0.06	0.2	6.98	7.22	7.3
54	127661	7	2	93	110	104	99	110	-17	-11	-6	1.02	0.88	0.58	0.45	0.45	0.14	0.44	0.57	6.81	7.22	7.22
55	1288157	7	12	91	99	106	101	106	-8	-15	-10	2.36	1.17	0.66	0.32	2.36	1.19	1.7	2.04	7.2	7.29	7.44
56	1311673	7	-	92	99	98	-	99	-7	-6	-	0.57	0.32	0.17	-	0.57	0.25	0.4	-	7.35	7.36	7.3
57	875827	8	24	99	143	142	137	143	-44	-43	-38	0.48	0.79	1.7	2.24	2.24	-0.31	-1.22	-1.76	9.19	7.08	7.01
58	1319260	8	5	113	124	121	117	124	-11	-8	-4	0.38	0.33	0.35	0.32	0.38	0.05	0.03	0.06	7.05	7.28	7.43
59	1319190	8	-	106	109	107	-	109	-3	-1	-	0.95	0.24	0.19	-	0.95	0.71	0.76	-	7.24	7.27	7.29
60	1327512	8	-10	104	93	99	100	104	11	5	4	0.49	0.4	0.43	0.48	0.49	0.09	0.06	0.01	7.37	7.53	7.6
61	1319189	8	9	96	101	113	109	113	-5	-17	-13	0.47	-	0.4	0.31	0.47	-	0.07	0.16	7.34	7.25	7.15
62	1323268	8	21	110	119	116	105	119	-9	-6	5	2.11	2.34	1.78	0.91	2.34	-0.23	0.33	1.2	7.03	7.26	7.3
63	1278601	8	3	104	107	109	107	109	-3	-5	-3	0.23	-	0.12	0.1	0.1	-	0.11	0.13	7.42	7.34	7.38
64	1325699	8	-1	94	102	102	96	102	-8	-8	-2	0.27	0.22	0.3	0.34	0.34	0.05	-0.03	-0.07	7.43	7.43	7.43

SR.NO.	MRD NO	BLOCK No.	pH value [at 72 hours]	Lowest pH value	Diff pH value [at 24 hours]	Diff pH value [at 48 hours]	Diff pH value [at 72 hours]	Lactate [at admission]	Lactate [at 24 hours]	Lactate [at 48 hours]	Lactate [at 72 hours]	Maximum Lactate value	Diff Lactate [at 24 hours]	Diff Lactate [at 48 hours]	Diff Lactate [at 72 hours]	Base excess [at admission]	Base excess [at 24 hours]	Base excess [at 48 hours]	Base excess [at 72 hours]
1	1121421	1	7.49	7.38	0.22	0.09	0.11	1.2	1.5	2.3	1.1	2.3	-0.3	-1.1	0.1	4.9	0.3	-3.2	-6.5
2	1128962	1	7.46	7.34	-0.03	-0.01	-0.12	2.6	1.3	2.4	1.9	2.6	1.3	0.2	0.7	-7.5	-1.6	2	2.5
3	1133738	1	-	7.25	0.01	-0.07	-	2	1.2	1.4	-	2	0.8	0.6	-	-15	-14.9	-12.7	-
4	1133994	1	-	-	-	-	-	9.3	-	-	-	-	-	-	-	-19.5	-	-	-
5	1135669	1	7.5	7.36	0.02	0.03	-0.11	1.8	0.7	0.5	0.5	1.8	1.1	1.3	1.3	-5.6	-5.1	-1.7	7.2
6	1136549	1	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-4.7	-	-	-
7	1137737	1	7.32	7.48	0.04	-0.22	-0.43	3.4	1.1	0.8	0.8	3.4	2.3	2.6	2.6	-29.7	-18.9	-10.1	-2.6
8	1140495	1	7.39	7.27	-0.06	-0.1	-0.12	1.2	0.7	0.5	0.6	1.2	0.5	0.7	0.6	-0.3	-0.6	0.15	5.3
9	1173215	2	-	-	-	-	-	5.5	-	-	-	-	-	-	-	-1	-	-	-
10	1138247	2	7.44	7.36	0.09	0.09	0.01	1.4	1.1	1.2	2.4	2.4	0.3	0.2	-1	-1.8	-3.4	3.4	0.9
11	1161245	2	-	7.36	0.05	-	-	3.2	0.7	-	-	3.2	2.5	-	-	0.1	0.6	-	-
12	1389176	2	7.45	7.42	-0.12	-0.02	-0.03	1.2	1.1	1.1	2.6	2.6	0.1	0.1	-1.4	1.4	-2	2.3	2.4
13	1373025	2	7.46	7.35	-0.14	-0.15	-0.11	3.4	1.4	1.2	0.9	3.4	2	2.2	2.5	-5.4	4.1	8.8	7.5
14	1396457	2	-	7.36	-0.14	-	-	5.1	1.3	-	-	5.1	3.8	-	-	12.5	6.4	-	-
15	1381376	2	7.49	7.41	0.15	0.03	0.07	4.3	1.7	1.8	1.2	4.3	2.6	2.5	3.1	-2.5	2.7	7.4	7.2
16	1396480	2	7.4	6.85	-0.35	-0.51	-0.55	2.5	0.6	0.5	1.2	2.5	1.9	2	1.3	-30	-18.2	-16.4	-9.9
17	1164166	3	7.39	6.91	-0.31	-0.41	-0.48	3	1.5	0.6	1.1	3	1.5	2.4	1.9	-30	-20.7	-11.2	-4.4
18	485278	3	7.49	7.38	-0.03	-0.06	-0.11	2.3	2	1.2	1.7	2.3	0.3	1.1	0.6	-6.2	-3.1	-1.4	-0.4
19	1174725	3	7.53	7.43	-0.06	-0.11	-0.1	4.9	2.7	2.4	2.2	4.9	2.2	2.5	2.7	-7.7	-4.2	0.6	0.4
20	1174830	3	7.42	7.19	-0.17	-0.17	-0.23	3.1	1.7	1.5	1.5	3.1	1.4	1.6	1.6	-19.4	-7.9	-5.1	2.7
21	1175301	3	-	7.48	0.04	0.03	-	2.3	1.7	1	-	2.3	0.6	1.3	-	-11.5	-7.9	1.8	-
22	1391357	3	7.36	7.25	0.13	0.05	0.02	3.2	0.7	0.7	0.7	3.2	2.5	2.5	2.5	4.5	4.8	16.3	17.5
23	1399747	3	7.51	7.51	0.06	-0.02	0	1.9	2.1	2.4	1.3	2.4	-0.2	-0.5	0.6	-6.7	-3.8	4	1.7
24	26571	3	7.58	7.27	-0.13	-0.22	-0.31	4.7	1.6	0.8	1.4	4.7	3.1	3.9	3.3	-12.2	-5.6	6.4	16.5
25	1175446	4	-	7.43	0.03	0.04	-	1	1.2	1.3	-	1.3	-0.2	-0.3	-	-1.1	1.3	2.8	-
26	1178659	4	7.39	6.87	-0.31	-0.43	-0.52	1.7	3.3	3	2.2	3.3	-1.6	-1.3	-0.5	-29.2	-23.9	-17.5	-9.9
27	248202	4	-	-	-0.45	-	-	3	0.9	-	-	3	2.1	-	-	-28.5	-11.8	-	-
28	1181796	4	-	7.44	-0.09	-	-	1.8	2.2	-	-	2.2	-0.4	-	-	3	1.5	-	-
29	1178877	4	7.5	7.46	-	-	-0.04	2.7	-	-	0.9	2.7	-	-	1.8	-1.8	-	-	4.1
30	1179825	4	-	-	-	-	-	11.2	-	-	-	-	-	-	-	-18.9	-	-	-
31	1396478	4	7.48	7.19	-0.26	-0.26	-0.29	6.9	0.8	1.1	1.1	6.9	6.1	5.8	5.8	-6.4	1	2.4	2.6
32	1397549	4	7.52	7.31	-0.01	-0.12	-0.21	5.7	1.5	1	0.7	5.7	4.2	4.7	5	-7.7	-3.9	-3.1	8.1
33	1184248	5	7.51	7.5	-	-	-0.01	3.6	-	-	1.3	3.6	-	-	2.3	-6.8	-	-	4.9
34	1200417	5	7.46	7.3	0.04	-0.06	-0.12	7.6	3.9	3	1.2	7.6	3.7	4.6	6.4	-11.8	-7.7	-5.6	-1.8
35	1190783	5	-	7.37	-	0.1	-	1.9	-	3.5	-	3.5	-	-1.6	-	-1.1	-4.4	-7.4	-
36	1195251	5	-	7.42	-0.02	-0.01	-	5.3	1	1.7	-	5.3	4.3	3.6	-	-1.8	5	-1.1	-
37	1205478	5	7.46	7.38	0.06	0.02	-0.02	2.7	15	11.2	0.6	15	-12.3	-8.5	2.1	-0.4	-16.8	0.8	3.9
38	1073314	5	7.19	6.96	0.07	-0.17	-0.16	1.4	1.7	1.3	0.9	1.7	-0.3	0.1	0.5	-26	-20.9	-14.7	-14
39	1197275	5	7.44	7.37	-0.1	-0.13	-0.07	6.5	1.8	1.6	1.6	6.5	4.7	4.9	4.9	-3.3	2.7	3.3	3
40	1220841	5	7.42	7.28	0.08	0.07	-0.06	2.3	1.3	3	1.6	3	1	-0.7	0.7	-6.2	-8.6	8	-3.1
41	1221464	6	7.47	7.21	-0.03	-0.08	-0.26	1.9	1.3	1.4	2.1	2.1	0.6	0.5	-0.2	-19	-6	-3	1
42	1226970	6	7.36	7.21	-0.15	-0.17	-0.15	10.4	3.5	2.2	1.2	10.4	6.9	8.2	9.2	-17.1	-7.3	-6.3	-3.9
43	1230915	6	7.23	7.13	0.05	0.21	0.11	6.2	11.4	3.8	2.7	11.4	-5.2	2.4	3.5	-8.5	-19.4	-11.9	-8.3
44	1234221	6	7.44	7.33	-0.07	0.02	-0.07	1.2	1.3	1.5	2.5	2.5	-0.1	-0.3	-1.3	1.3	6.4	1.5	2.9
45	1233838	6	-	7.29	-0.18	-0.17	-	4	2.7	3.5	-	4	1.3	0.5	-	-18	-7	-2.5	-
46	1234306	6	7.45	7.32	-0.17	-0.17	-0.3	8.4	1.2	1.1	1.3	8.4	7.2	7.3	7.1	-15.3	-7.6	-8.6	1.7
47	1246837	6	-	7.17	0.05	-	-	1.6	1.2	-	-	1.6	0.4	-	-	-6.3	-4.8	-	-
48	1247942	6	7.39	7.34	-0.02	-0.03	-0.05	0.6	0.8	1	0.7	1	-0.2	-0.4	-0.1	-10.7	-6.2	-2.1	1.3
49	1251417	7	7.31	7.26	0.02	0.06	0.01	4.1	1.1	0.6	1.1	4.1	3	3.5	3	-8.1	-6.2	-4.7	-8.2
50	1252159	7	7.52	7.45	-0.09	-0.02	-0.07	2.9	1.2	0.9	0.7	2.9	1.7	2	2.2	-2.5	13.4	12	11.4
51	1254598	7	7.41	6.82	-0.36	-0.52	-0.59	2.1	0.6	0.6	0.5	1	1.5	1.5	1.6	-30	-19.1	-15.8	-9
52	1256939	7	7.44	7.31	-0.05	-0.13	-0.13	5.1	0.4	0.9	2.4	5.1	4.7	4.2	2.7	-9.7	-5.1	-3.1	2.3
53	1260733	7	7.42	6.98	-0.24	-0.32	-0.44	15	2.2	1.3	1.3	15	12.8	13.7	13.7	-28.1	-15.8	-5.2	0.8
54	127661	7	7.42	6.81	-0.41	-0.41	-0.61	3.8	5.6	4.6	1.4	5.6	-1.8	-0.8	2.4	-30	-21.6	-9.3	-1.1
55	1288157	7	7.46	7.2	-0.09	-0.24	-0.26	5.5	2	1.1	0.9	5.5	3.5	4.4	4.6	-19.4	-8.5	-0.4	0.1
56	1311673	7	-	7.3	-0.01	0.05	-	7.2	1.7	1.6	-	7.2	5.5	5.6	-	-9	-1.1	-4.3	-
57	875827	8	7.01	7.01	2.11	2.18	2.18	0.4	1	1.5	1.9	1.9	-0.6	-1.1	-1.5	-18.7	-18.1	-21.8	-21.8
58	1319260	8	7.59	7.05	-0.23	-0.38	-0.54	1.7	2.1	2.3	2.2	2.3	-0.4	-0.6	-0.5	-9.5	-7	-8.4	2.3
59	1319190	8	7.38	7.24	-0.03	-0.05	-0.14	1.9	2.6	3.6	3.1	3.6	-0.7	-1.7	-1.2	-20.1	-14.3	-11.7	-12.1
60	1327512	8	7.35	7.35	-0.16	-0.23	0.02	2.2	1.8	1.1	1.1	1.1	0.4	1.1	1.1	-0.4	0.7	0	0.3
61	1319189	8	7.3	7.15	0.09	0.19	0.04	1.3	2.1	3.4	2.7	3.4	-0.8	-2.1	-1.4	-10.2	-14.3	-17.8	-13.1
62	1323268	8	7.38	7.03	-0.23	-0.27	-0.35	1.4	1.8	1.6	2.3	2.3	-0.4	-0.2	-0.9	-19.2	-12.7	-2.8	2.1
63	1278601	8	7.37	7.34	0.08	0.04	0.05	1.7	0.6	0.9	0.6	1.7	1.1	0.8	1.1	-0.5	-3.7	-0.8	4.2
64	1325699	8	7.38	7.43	0	0	0.05	3.7	1.4	1.3	1.5	3.7	2.3	2.4	2.2	2.9	0.3	-1.1	3.3

SR.NO.	MRD NO	BLOCK No.	Most negative Base excess value	diff Base excess [at 24 hours]	diff Base excess [at 48 hours]	diff Base excess [at 72 hours]	Anion gap [at admission]	Anion gap [at 24 hours]	Anion gap [at 48 hours]	Anion gap [at 72 hours]	Diff Anion gap [at 24 hours]	Diff Anion gap [at 48 hours]	Diff Anion gap [at 72 hours]	Renal replacement therapy	Type of RRT	Number of days of RRT	Packed cell transfusion requirement	No. of units of Packed cell transfused	Fresh frozen plasma transfused	No. of units of FFP transfused	Platelets transfused
1	1121421	1	-6.5	4.6	8.1	11.4	5.7	5.6	6.5	5.4	0.1	-0.8	0.3	No	-	-	No	-	No	-	No
2	1128962	1	-7.5	-5.9	-9.5	-10	16.2	10.2	7.7	8.6	6	8.5	7.6	No	-	-	No	-	No	-	No
3	1133738	1	-15	-0.1	-2.3	-	15.5	11.3	8	-	4.2	7.5	-	No	-	-	No	-	No	-	No
4	1133994	1	-	-	-	-	22.1	-	-	-	-	-	-	No	-	-	No	-	No	-	Yes
5	1135669	1	-5.6	-0.5	-3.9	-12.8	18.5	5.6	2.9	4.9	12.9	15.6	13.6	No	-	-	No	-	No	-	No
6	1136549	1	-	-	-	-	14.1	-	-	-	-	-	-	No	-	-	No	-	No	-	No
7	1137737	1	-29.7	-10.8	-19.6	-27.1	28.7	13.7	14.2	10.5	15	14.5	18.2	No	-	-	No	-	No	-	No
8	1140495	1	-0.6	0.3	-0.45	-5.6	14.9	10.7	8	7.3	4.2	6.9	7.6	No	-	-	No	-	No	-	No
9	1173215	2	-	-	-	-	9.6	-	-	-	-	-	-	No	-	-	No	-	No	-	No
10	1138247	2	-3.4	1.6	-5.2	-2.7	7.1	6.5	0.4	7.2	0.6	6.7	-0.1	No	-	-	No	-	No	-	No
11	1161245	2	0.1	-0.5	-	-	11.3	9.4	#VALUE!	-	1.9	#VALUE!	-	No	-	-	No	-	No	-	No
12	1389176	2	-2	3.4	-0.9	-1	12.1	6.5	8.8	9.5	5.6	3.3	2.6	No	-	-	No	-	No	-	No
13	1373025	2	-5.2	-9.5	-14.2	-12.9	10.1	8.9	6.8	3.8	1.2	3.3	6.3	No	-	-	No	-	No	-	No
14	1396457	2	4	6.1	-	-	21.4	14.3	-	-	7.1	-	-	No	-	-	No	-	No	-	No
15	1381376	2	-2.5	-5.2	-9.9	-9.7	9.9	11.2	1.8	8.9	-1.3	8.1	1	No	-	-	No	-	No	-	No
16	1396480	2	-30	-11.8	-13.6	-20.1	36	12	12.6	10	24	23.4	26	No	-	-	No	-	No	-	No
17	1164166	3	-4.4	-9.3	-18.8	-25.6	38	16.3	10.1	8.5	21.7	27.9	29.5	No	-	-	No	-	No	-	No
18	485278	3	-6.2	-3.1	-4.8	-5.8	21.2	8.6	5.8	4.9	12.6	15.4	16.3	No	-	-	No	-	No	-	No
19	1174725	3	-7.7	-3.5	-8.3	-8.1	13	4.9	9.9	14	8.1	3.1	-1	No	-	-	No	-	No	-	No
20	1174830	3	-19.4	-11.5	-14.3	-22.1	24.4	10.6	9.7	1.8	13.8	14.7	22.6	No	-	-	Yes	1	No	-	Yes
21	1175301	3	-11.5	-3.6	-13.3	-	15.8	#VALUE!	6.7	-	#VALUE!	9.1	-	No	-	-	No	-	No	-	No
22	1391357	3	4.5	-0.3	-11.8	-13	10.8	13.9	6.3	9.3	-3.1	4.5	1.5	No	-	-	No	-	No	-	No
23	1399747	3	-6.7	-2.9	-10.7	-8.4	10.1	#VALUE!	5.8	3.8	#VALUE!	4.3	6.3	No	-	-	No	-	No	-	No
24	26571	3	-12.2	-6.6	-18.6	-28.7	14.3	3.6	11.4	2.3	10.7	2.9	12	No	-	-	No	-	No	-	No
25	1175446	4	-	-2.4	-3.9	-	5.7	9.2	9	-	-3.5	-3.3	-	No	-	-	No	-	No	-	No
26	1178659	4	.29.2	-5.3	-11.7	-19.3	18.5	10.6	6.1	8.9	7.9	12.4	9.6	No	-	-	No	-	No	-	No
27	248202	4	-28.5	-16.7	-	-	35.8	8.9	#VALUE!	#VALUE!	26.9	#VALUE!	#VALUE!	No	-	-	No	-	No	-	No
28	1181796	4	1.5	1.5	-	-	5.4	10.8	#VALUE!	#VALUE!	-5.4	#VALUE!	#VALUE!	No	-	-	No	-	No	-	No
29	1178877	4	-1.8	-	-	-5.9	8.6	#VALUE!	#VALUE!	7.9	#VALUE!	#VALUE!	0.7	No	-	-	No	-	No	-	No
30	1179825	4	-	-	-	-	25.6	-	-	-	-	-	-	No	-	-	No	-	Yes	2	Yes
31	1396478	4	-6.4	-7.4	-8.8	-9	21.6	7.1	8.3	5.9	14.5	13.3	15.7	No	-	-	No	-	No	-	No
32	1397549	4	-7.7	-3.8	-4.6	-15.8	20.6	5.3	9.9	6.1	15.3	10.7	14.5	No	-	-	No	-	No	-	No
33	1184248	5	-6.8	-	-	-11.7	13.3	-	-	5.3	-	-	8	No	-	-	No	-	No	-	No
34	1200417	5	-11.8	-4.1	-6.2	-10	14.6	10	8.9	2.4	4.6	5.7	12.2	No	-	-	No	-	No	-	No
35	1190783	5	-7.4	3.3	6.3	-	11.6	#VALUE!	10.2	#VALUE!	#VALUE!	1.4	#VALUE!	No	-	-	No	-	No	-	Yes
36	1195251	5	-1.8	-6.8	-0.7	-	13	1.8	11.8	-	11.2	1.2	-	No	-	-	No	-	No	-	Yes
37	1205478	5	-16.8	16.4	-1.2	-4.3	10	18	5.9	-0.7	-8	4.1	10.7	No	-	-	Yes	7	Yes	2	No
38	1073314	5	-26	-5.1	-11.3	-12	22	16	16.6	12.2	6	5.4	9.8	No	-	-	No	-	No	-	Yes
39	1197275	5	-3.3	-6	-6.6	-6.3	14	4.6	2.5	2.1	9.4	11.5	11.9	No	-	-	No	-	Yes	2	Yes
40	1220841	5	-6.2	2.4	-14.2	-3.1	10.8	7.7	16.6	1.6	3.1	-5.8	9.2	No	-	-	No	-	No	-	No
41	1221464	6	-19	-13	-16	-20	25	13	8.4	5.1	12	16.6	19.9	No	-	-	Yes	1	No	-	No
42	1226970	6	-17.1	-9.8	-10.8	-13.2	22.5	11.9	11.1	14.5	10.6	11.4	8	No	-	-	No	-	Yes	2	Yes
43	1230915	6	-11.9	10.9	3.4	-0.2	10.4	20	6	8.7	-9.6	4.4	1.7	No	-	-	No	-	No	-	No
44	1234221	6	1.3	-5.1	-0.2	-1.6	6.7	1.4	14.9	4.1	5.3	-8.2	2.6	No	-	-	No	-	No	-	No
45	1233838	6	-18	-11	-15.5	-	17.8	11.8	13.7	#VALUE!	6	4.1	#VALUE!	No	-	-	No	-	No	-	No
46	1234306	6	-15.3	-7.7	-6.7	-17	21.5	8.4	15.1	8.7	13.1	6.4	12.8	No	-	-	No	-	No	-	No
47	1246837	6	-6.3	-1.5	-	-	12.5	8.6	-	-	3.9	-	-	No	-	-	No	-	No	-	No
48	1247942	6	-10.7	-4.5	-8.6	-12	16	12	10	10	4	6	6	No	-	-	No	-	No	-	Yes
49	1251417	7	-8.2	-1.9	-3.4	0.1	14.9	10.5	7.5	8.9	4.4	7.4	6	No	-	-	Yes	1	Yes	1	No
50	1252159	7	-2.5	-15.9	-14.5	-13.9	14.8	12.5	6.6	9.8	2.3	8.2	5	No	-	-	Yes	1	No	-	Yes
51	1254598	7	-30	-10.9	-14.2	-21	40	19	23.9	8.1	21	16.1	31.9	No	-	-	No	-	No	-	No
52	1256939	7	-9.7	-4.6	-6.6	-12	15.3	6.6	12	12.9	8.7	3.3	2.4	No	-	-	No	-	No	-	No
53	1260733	7	-28.1	-12.3	-22.9	-28.9	25.8	3.1	5.1	7.4	22.7	20.7	18.4	No	-	-	No	-	No	-	No
54	127661	7	-30	-8.4	-20.7	-28.9	40	24	19.4	12.4	16	20.6	27.6	No	-	-	No	-	No	-	No
55	1288157	7	-19.4	-10.9	-19	-19.5	27.5	14.6	9	13	12.9	18.5	14.5	No	-	-	Yes	1	No	-	Yes
56	1311673	7	-9	-7.9	-4.7	-	20.1	12.1	10.4	#VALUE!	8	9.7	#VALUE!	No	-	-	No	-	No	-	Yes
57	875827	8	-21.8	-0.6	3.1	3.1	22.5	12.3	14.3	11.8	10.2	8.2	10.7	No	-	-	No	-	No	-	No
58	1319260	8	-9.5	-2.5	-1.1	-11.8	14.5	9.3	10.1	5.4	5.2	4.4	9.1	No	-	-	No	-	No	-	No
59	1319190	8	-20.1	-5.8	-8.4	-8	22.4	13.8	14.3	#VALUE!	8.6	8.1	#VALUE!	No	-	-	No	-	No	-	No
60	1327512	8	-0.4	-1.1	-0.4	-0.7	14.1	11.9	5.7	7.5	2.2	8.4	6.6	No	-	-	No	-	No	-	No
61	1319189	8	-17.8	4.1	7.6	2.9	16.4	23.7	10.7	14.6	-7.3	5.7	1.8	No	-	-	No	-	No	-	No
62	1323268	8	-19.2	-6.5	-16.4	-21.3	17.8	18.6	20.7	27.8	-0.8	-2.9	-10	No	-	-	No	-	No	-	No
63	1278601	8	-3.7	3.2	0.3	-4.7	8.7	8.6	4.3	6.2	0.1	4.4	2.5	No	-	-	Yes	1	No	-	Yes
64	1325699	8	-1.1	2.6	4	-0.4	11.7	6.2	4.6	8.3	5.5	7.1	3.4	No	-	-	No	-	No	-	No

SR.NO.	MRD NO	BLOCK No.	No. of units of RDP transfused	No. of units of SDP transfused	Albumin transfusion	Number of times Albumin transfused	Need for Mechanical ventilation	Mechanical ventilation - Duration [days]	Non-Invasive Ventilation	Non-Invasive Ventilation : Duration [days]	Need for Inotropes	Inotropes	Dopamine [Day1] - mcg/kg/min	Dopamine [Day2] - mcg/kg/min	Dopamine [Day3] - mcg/kg/min	Dobutamine [Day1] - mcg/kg/min
1	1121421	1	-	-	No	-	No	-	No	-	Yes	norepinephrine	-	-	-	-
2	1128962	1	-	-	No	-	No	-	No	-	No	-	-	-	-	-
3	1133738	1	-	-	No	-	No	-	No	-	No	-	-	-	-	-
4	1133994	1	2	-	Yes	1	Yes	1	No	-	Yes	dopamine, epinephrine, norepinephrine, vasopressin	4	-	-	-
5	1135669	1	-	-	No	-	No	-	No	-	Yes	dobutamine, norepinephrine	-	-	-	6
6	1136549	1	-	-	No	-	Yes	1	No	-	No	-	-	-	-	-
7	1137737	1	-	-	No	-	No	-	No	-	No	-	-	-	-	-
8	1140495	1	-	-	No	-	No	6	Yes	1	No	-	-	-	-	-
9	1173215	2	-	-	No	-	No	-	Yes	<1	No	-	-	-	-	-
10	1138247	2	-	-	No	-	No	-	Yes	3	Yes	epinephrine, norepinephrine	-	-	-	-
11	1161245	2	-	-	No	-	No	-	No	-	Yes	dopamine	6	6	-	-
12	1389176	2	-	-	No	-	No	-	No	-	No	-	-	-	-	-
13	1373025	2	-	-	Yes	2	No	-	No	-	Yes	epinephrine, norepinephrine	-	-	-	-
14	1396457	2	-	-	No	-	No	-	No	-	Yes	epinephrine, norepinephrine, vasopressin	-	-	-	-
15	1381376	2	-	-	No	-	Yes	15	No	-	No	-	-	-	-	-
16	1396480	2	-	-	No	-	No	-	No	-	No	-	-	-	-	-
17	1164166	3	-	-	No	-	No	-	No	-	No	-	-	-	-	-
18	485278	3	-	-	No	-	No	-	No	-	No	-	-	-	-	-
19	1174725	3	-	-	No	-	No	-	No	-	No	-	-	-	-	-
20	1174830	3	2	-	No	-	Yes	15	No	-	Yes	dopamine	8	8	10	-
21	1175301	3	-	-	No	-	No	-	No	-	No	-	-	-	-	-
22	1391357	3	-	-	No	-	Yes	5	Yes	1	Yes	norepinephrine	-	-	-	-
23	1399747	3	-	-	No	-	No	-	Yes	2	Yes	dobutamine	-	-	-	4
24	26571	3	-	-	Yes	1	No	-	Yes	1	No	-	-	-	-	-
25	1175446	4	-	-	No	-	No	-	No	-	No	-	-	-	-	-
26	1178659	4	-	-	No	-	No	-	No	-	No	-	-	-	-	-
27	248202	4	-	-	No	-	No	-	No	-	No	-	-	-	-	-
28	1181796	4	-	-	No	-	No	-	No	-	No	-	-	-	-	-
29	1178877	4	-	-	No	-	No	-	No	-	No	-	-	-	-	-
30	1179825	4	1	-	No	-	Yes	1	No	-	Yes	epinephrine, norepinephrine	-	-	-	-
31	1396478	4	-	-	No	-	No	-	No	-	Yes	norepinephrine	-	-	-	-
32	1397549	4	-	-	Yes	1	No	-	Yes	2	Yes	dopamine, norepinephrine	12	-	-	-
33	1184248	5	-	-	No	-	No	-	No	-	No	-	-	-	-	-
34	1200417	5	-	-	No	-	No	-	Yes	3	Yes	epinephrine, norepinephrine	-	-	-	-
35	1190783	5	4	1	No	-	No	-	Yes	2	No	-	-	-	-	-
36	1195251	5	4	-	No	-	No	-	Yes	2	Yes	dopamine, dobutamine	10	10	-	-
37	1205478	5	-	-	Yes	2	Yes	5	No	-	Yes	epinephrine, norepinephrine	-	-	-	-
38	1073314	5	1	-	No	-	No	-	No	-	Yes	dobutamine, epinephrine, norepinephrine	-	-	-	-
39	1197275	5	2	-	Yes	1	No	-	No	-	No	-	-	-	-	-
40	1220841	5	-	-	No	-	No	-	Yes	3	Yes	norepinephrine	-	-	-	-
41	1221464	6	-	-	Yes	1	Yes	8	No	-	Yes	norepinephrine	-	-	-	-
42	1226970	6	1	-	Yes	1	No	-	Yes	3	Yes	dopamine	4	4	-	-
43	1230915	6	-	-	No	-	Yes	2	Yes	2	Yes	dopamine, norepinephrine	8	8	10	-
44	1234221	6	-	-	No	-	No	-	No	-	No	-	-	-	-	-
45	1233838	6	-	-	No	-	No	-	No	-	No	-	-	-	-	-
46	1234306	6	-	-	Yes	2	Yes	6	Yes	2	Yes	norepinephrine	-	-	-	-
47	1246837	6	-	-	No	-	Yes	1.5	No	-	Yes	epinephrine, norepinephrine	-	-	-	-
48	1247942	6	2	-	No	-	No	-	No	-	Yes	norepinephrine	-	-	-	-
49	1251417	7	-	-	Yes	1	Yes	16	Yes	2	Yes	norepinephrine	-	-	-	-
50	1252159	7	2	-	No	-	Yes	5	Yes	6	Yes	epinephrine, norepinephrine	-	-	-	-
51	1254598	7	-	-	No	-	No	-	No	-	No	-	-	-	-	-
52	1256939	7	-	-	No	-	Yes	2	No	-	No	-	-	-	-	-
53	1260733	7	-	-	Yes	1	Yes	16	Yes	6	Yes	norepinephrine	-	-	-	-
54	127661	7	-	-	No	-	No	-	No	-	No	-	-	-	-	-
55	1288157	7	1	-	No	-	No	-	No	-	Yes	norepinephrine	-	-	-	-
56	1311673	7	2	-	No	-	Yes	3	No	-	Yes	dopamine, norepinephrine	-	12	-	-
57	875827	8	-	-	No	-	Yes	5	No	-	Yes	epinephrine, norepinephrine	-	-	-	-
58	1319260	8	-	-	No	-	Yes	5	Yes	3	No	-	-	-	-	-
59	1319190	8	-	-	No	-	No	-	No	-	No	-	-	-	-	-
60	1327512	8	-	-	No	-	Yes	8	No	-	No	-	-	-	-	-
61	1319189	8	-	-	No	-	No	-	No	-	No	-	-	-	-	-
62	1323268	8	-	-	No	-	No	-	No	-	Yes	dopamine, epinephrine	6	4	-	-
63	1278601	8	1	-	No	-	No	-	No	-	No	-	-	-	-	-
64	1325699	8	-	-	No	-	No	-	Yes	3	No	-	-	-	-	-

SR.NO.	MRD NO	BLOCK No.	Dobutamine [Day2] - mcg/kg/min	Dobutamine [Day3] - mcg/kg/min	Epinephrine [Day1] - mcg/kg/min	Epinephrine [Day2] - mcg/kg/min	Epinephrine [Day3] - mcg/kg/min	Nor-epinephrine [Day1] - mcg/kg/min	Nor-epinephrine [Day2] - mcg/kg/min	Nor-epinephrine [Day3] - mcg/kg/min	Milrinone [Day1] - mcg/kg/min	Milrinone [Day2] - mcg/kg/min	Milrinone [Day3] - mcg/kg/min	Vasopressin [Day1] - U/kg/min	Vasopressin [Day2] - U/kg/min	Vasopressin [Day3] - U/kg/min	VIS [Day 1]	VIS [Day 2]	VIS [Day 3]	Maximum MAP [day 1]	Minimum MAP [day 1]
1	1121421	1	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	63	43
2	1128962	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1133738	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	1133994	1	-	-	0.3	-	-	0.2	-	-	-	-	-	0.09	-	-	-	-	-	28	22
5	1135669	1	-	-	-	-	-	0.1	0.6	-	-	-	-	-	-	-	-	-	-	73	61
6	1136549	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	1137737	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	1140495	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	1173215	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	1138247	2	-	-	-	-	0.1	0.18	0.3	0.2	-	-	-	-	-	-	-	-	-	-	-
11	1161245	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	83	66
12	1389176	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	1373025	2	-	-	0.1	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	94	77
14	1396457	2	-	-	0.2	0.3	-	0.3	1	-	-	-	-	-	0.06	-	-	-	-	82	38
15	1381376	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	1396480	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	1164166	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	485278	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	1174725	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	1174830	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	47
21	1175301	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	1391357	3	-	-	-	-	-	0.3	0.1	0.2	-	-	-	-	-	-	-	-	-	-	-
23	1399747	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64	52
24	26571	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	1175446	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	1178659	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	248202	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	1181796	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	1178877	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	1179825	4	-	-	0.5	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
31	1396478	4	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-
32	1397549	4	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	88	52
33	1184248	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	1200417	5	-	-	-	0.1	-	-	0.4	0.2	-	-	-	-	-	-	-	-	-	-	-
35	1190783	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	1195251	5	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	107	61
37	1205478	5	-	-	0.1	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	74	52
38	1073314	5	6	10	-	0.2	0.1	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-
39	1197275	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	1220841	5	-	-	-	-	-	1	0.7	0.4	-	-	-	-	-	-	-	-	-	82	54
41	1221464	6	-	-	-	-	-	0.12	0.1	0.2	-	-	-	-	-	-	-	-	-	64	43
42	1226970	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	1230915	6	-	-	-	-	-	-	0.1	0.2	-	-	-	-	-	-	-	-	-	56	44
44	1234221	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	1233838	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	1234306	6	-	-	-	-	-	0.3	1	0.6	-	-	-	-	-	-	-	-	-	68	48
47	1246837	6	-	-	-	1	-	0.6	1.5	-	-	-	-	-	-	-	-	-	-	63	39
48	1247942	6	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	77	64
49	1251417	7	-	-	-	-	-	0.6	0.2	1	-	-	-	-	-	-	-	-	-	85	63
50	1252159	7	-	-	0.1	-	-	0.3	0.3	0.1	-	-	-	-	-	-	-	-	-	89	68
51	1254598	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	1256939	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	1260733	7	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	82	56
54	127661	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	1288157	7	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	64	41
56	1311673	7	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-
57	875827	8	-	-	0.1	0.1	-	0.2	0.4	0.1	-	-	-	-	-	-	-	-	-	62	43
58	1319260	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	1319190	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	1327512	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	1319189	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	1323268	8	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74	61
63	1278601	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64	1325699	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SR.NO.	MRD NO	BLOCK No.	Maximum MAP [day 2]	Minimum MAP [day 2]	Maximum MAP [day 3]	Minimum MAP [day 3]	Duration of Inotropes [days]	Maximum Inotropic score	KDIGO STAGE [at admission]	KDIGO STAGE [after 72 hours]	ICU admission date	Number of days in ICU	Patient outcome	If died ; death	Date of Hospital discharge or death	Duration of hospital stay
1	1121421	1	82	62	64	54	5	10	0	0	12/6/2021	15	Improved & Discharged	-	7/1/2021	20
2	1128962	1	-	-	-	-	-	-	0	0	6/28/2021	11	Improved & Discharged	-	7/12/2021	14
3	1133738	1	-	-	-	-	-	-	3	0	7/4/2021	6	Improved & Discharged	-	7/13/2021	5
4	1133994	1	-	-	-	-	1	954	3	-	7/9/2021	1	Died	-	7/9/2021	1
5	1135669	1	79	63	76	62	2	60	0	0	7/12/2021	8	Improved & Discharged	-	7/21/2021	9
6	1136549	1	-	-	-	-	-	-	0	-	7/14/2021	<1	DAMA	-	7/14/2021	1
7	1137737	1	-	-	-	-	-	-	2	0	7/16/2021	3	Improved & Discharged	-	7/22/2021	6
8	1140495	1	-	-	-	-	-	-	0	0	7/21/2021	9	Improved & Discharged	-	8/8/2021	18
9	1173215	2	-	-	-	-	-	-	0	-	-	-	DAMA	-	9/15/2021	1
10	1138247	2	-	-	-	-	5	30	0	0	7/16/2021	11	Improved & Discharged	-	8/3/2021	18
11	1161245	2	79	67	-	-	2	6	0	0	8/26/2021	3	Improved & Discharged	-	9/1/2021	6
12	1389176	2	-	-	-	-	-	-	0	1	9/30/2022	27	DAMA	-	10/31/2022	31
13	1373025	2	80	70	84	80	1	20	1	0	9/4/2022	4	Improved & Discharged	-	9/9/2022	5
14	1396457	2	74	0	-	-	2	730	0	-	10/12/2022	2	Died	within 72hrs	10/14/2022	2
15	1381376	2	-	-	-	-	-	-	0	0	9/16/2022	15	DAMA	-	9/30/2022	14
16	1396480	2	-	-	-	-	-	-	0	0	10/14/2022	2	Improved & Discharged	-	11/9/2022	28
17	1164166	3	-	-	-	-	-	-	2	0	8/31/2021	6	Improved & Discharged	-	9/7/2021	7
18	485278	3	-	-	-	-	-	-	0	0	-	-	Improved & Discharged	-	9/22/2021	8
19	1174725	3	-	-	-	-	-	-	0	0	9/16/2021	4	Improved & Discharged	-	9/21/2021	5
20	1174830	3	64	49	65	52	15	10	3	0	9/17/2021	15	DAMA	-	10/1/2021	14
21	1175301	3	-	-	-	-	-	-	0	0	9/17/2021	3	Improved & Discharged	-	9/22/2021	5
22	1391357	3	-	-	-	-	5	30	0	0	10/4/2022	5	Died	>72hrs of hospital admission	10/8/2022	5
23	1399747	3	-	-	-	-	1	4	0	0	10/19/2022	4	Improved & Discharged	-	10/28/2022	9
24	26571	3	-	-	-	-	-	-	1	0	10/19/2022	3	Improved & Discharged	-	10/23/2022	4
25	1175446	4	-	-	-	-	-	-	0	0	9/18/2021	2	Improved & Discharged	-	9/20/2021	2
26	1178659	4	-	-	-	-	-	-	0	0	9/23/2021	4	Improved & Discharged	-	10/9/2021	16
27	248202	4	-	-	-	-	-	-	0	-	9/26/2021	1	Improved & Discharged	-	9/29/2021	3
28	1181796	4	-	-	-	-	-	-	0	0	9/28/2021	2	Improved & Discharged	-	10/2/2021	4
29	1178877	4	-	-	-	-	-	-	0	0	9/23/2021	3	Improved & Discharged	-	9/28/2021	5
30	1179825	4	-	-	-	-	1	80	1	-	9/25/2021	1	Died	within 72hrs	9/25/2021	0
31	1396478	4	-	-	-	-	1	20	1	0	10/12/2022	5	Improved & Discharged	-	10/25/2022	13
32	1397549	4	-	-	-	-	1	32	0	0	10/15/2022	4	Improved & Discharged	-	10/19/2022	5
33	1184248	5	-	-	-	-	-	-	2	0	10/2/2021	2	Improved & Discharged	-	10/7/2021	5
34	1200417	5	-	-	-	-	2	50	1	0	10/31/2021	12	Improved & Discharged	-	11/15/2021	15
35	1190783	5	-	-	-	-	-	-	0	0	10/14/2021	4	Improved & Discharged	-	10/21/2021	8
36	1195251	5	101	61	106	85	3	-	0	-	10/22/2021	4	Improved & Discharged	-	10/30/2021	9
37	1205478	5	-	-	-	-	1	60	0	2	11/11/2021	11	Improved & Discharged	-	11/21/2021	10
38	1073314	5	-	-	-	-	5	76	3	3	12/14/2021	6	DAMA	-	12/19/2021	5
39	1197275	5	-	-	-	-	-	-	1	0	10/25/2021	2	Improved & Discharged	-	10/31/2021	6
40	1220841	5	70	66	76	71	4	100	1	0	12/8/2021	7	Improved & Discharged	-	12/20/2021	12
41	1221464	6	66	49	70	51	3	20	2	3	12/10/2021	12	Improved & Discharged	-	12/24/2021	14
42	1226970	6	-	-	-	-	4	-	1	3	12/20/2021	10	Improved & Discharged	-	1/1/2022	12
43	1230915	6	54	48	54	50	4	30	0	3	12/29/2021	4	Died	>72hrs of hospital admission	1/1/2022	4
44	1234221	6	-	-	-	-	-	-	0	0	1/4/2022	11	Died	>72hrs of hospital admission	1/14/2022	10
45	1233838	6	-	-	-	-	-	-	2	0	1/4/2022	4	Improved & Discharged	-	1/10/2022	6
46	1234306	6	67	36	70	66	8	100	0	2	1/4/2022	8	Died	>72hrs of hospital admission	1/14/2022	10
47	1246837	6	49	36	-	-	1.5	250	0	-	1/31/2022	1.5	Died	within 72hrs	2/2/2022	2
48	1247942	6	76	70	77	72	1	20	3	0	2/3/2022	3	Improved & Discharged	-	2/13/2022	10
49	1251417	7	78	72	76	70	13	100	0	0	2/10/2022	21	Improved & Discharged	-	3/14/2022	32
50	1252159	7	87	76	84	75	4	40	0	0	2/11/2022	11	Improved & Discharged	-	2/23/2022	12
51	1254598	7	-	-	-	-	-	-	0	0	2/15/2022	3	Improved & Discharged	-	2/22/2022	7
52	1256939	7	-	-	-	-	-	-	0	0	2/21/2022	7	Improved & Discharged	-	2/27/2022	7
53	1260733	7	80	65	84	68	1	100	1	0	2/26/2022	64	Improved & Discharged	-	5/13/2022	76
54	127661	7	-	-	-	-	-	-	1	0	-	-	Improved & Discharged	-	3/23/2022	3
55	1288157	7	-	-	-	-	1	30	0	1	4/15/2022	10	Improved & Discharged	-	4/28/2022	13
56	1311673	7	-	-	-	-	1	92	0	0	5/26/2022	3	Died	within 72hrs	5/29/2022	3
57	875827	8	68	48	63	46	4	50	0	3	4/18/2022	5	DAMA	-	4/22/2022	4
58	1319260	8	-	-	-	-	-	-	0	0	6/8/2022	9	Died	-	6/16/2022	9
59	1319190	8	-	-	-	-	-	-	3	0	-	-	Improved & Discharged	-	6/13/2022	6
60	1327512	8	-	-	-	-	-	-	0	0	6/22/2022	14	Improved & Discharged	-	7/7/2022	15
61	1319189	8	-	-	-	-	-	-	0	0	-	-	Improved & Discharged	-	6/13/2022	6
62	1323268	8	78	63	76	64	2	66	3	1	6/14/2022	10	Improved & Discharged	-	6/30/2022	16
63	1278601	8	-	-	-	-	-	-	0	0	-	-	Improved & Discharged	-	7/2/2022	5
64	1325699	8	-	-	-	-	-	-	0	0	6/19/2022	7	Improved & Discharged	-	7/4/2022	16

SR.NO.	MRD NO	BLOCK No.	Envelope No. in the Block	GROUP	AGE [in years]	AGE [in months]	SEX	DATE of ADMISSION	CITY of RESIDENCE	WEIGHT [kg]	WEIGHT [centiles]	HEIGHT [centimeters]	HEIGHT [centiles]	BMI	CO-MORBIDITIES AT ADMISSION
65	1338684	9	1	PLASMA-LYTE	12	-	Female	7/10/2022	LUDHIANA	45	3rd - 50th	155	50th - 97th	18.7	NONE
66	1333077	9	2	NS	0	10	Male	7/1/2022	KAPURTHALA	10	50th - 97th	74	3rd - 50th	-	NONE
67	1336038	9	3	NS	0	6	Female	7/6/2022	LUDHIANA	4.5	<3rd	55	<3rd	-	Malignancy
68	1343822	9	4	PLASMA-LYTE	7	-	Female	7/19/2022	HOSHIARPUR	15	3rd - 50th	102	<3rd	15	NONE
69	1355143	9	5	PLASMA-LYTE	3	-	Male	8/6/2022	PATIALA	13	3rd - 50th	104	50th - 97th	-	NONE
70	1355749	9	6	PLASMA-LYTE	16	-	Female	8/7/2022	JALANDHAR	60	50th - 97th	158	50th - 97th	24.03	Immunosuppression by disease
71	1340176	9	7	NS	11	-	Female	7/12/2022	HOSHIARPUR	58	50th - 97th	15.4	50th - 97th	24.4	NONE
72	1351526	9	8	NS	2	7	Male	7/31/2022	JALANDHAR	10	3rd - 50th	93	50th - 97th	-	NONE
73	1356708	10	1	PLASMA-LYTE	5	-	Female	8/9/2022	KAPURTHALA	20	50th - 97th	124	>97th	12.3	NONE
74	1366195	10	2	PLASMA-LYTE	12	-	Male	8/24/2022	LUDHIANA	23	<3rd	128	<3rd	14	NONE
75	1355766	10	3	NS	1	-	Female	8/7/2022	MOGA	8.5	3rd - 50th	72	50th - 97th	-	NONE
76	1359301	10	4	NS	0	10	Female	8/13/2022	LUDHIANA	9	3rd - 50th	68	3rd - 50th	-	NONE
77	1382221	10	5	PLASMA-LYTE	3	-	Male	9/19/2022	LUDHIANA	12	<3rd	92	3rd - 50th	-	Immunosuppression by therapy
78	1388469	10	6	PLASMA-LYTE	3	-	Male	9/28/2022	HOSHIARPUR	14	3rd - 50th	97	50th - 97th	-	NONE
79	1366036	10	7	NS	16	-	Female	8/24/2022	BARNALA	27	<3rd	154	3rd - 50th	11.38	NONE
80	1387289	10	8	NS	4	-	Male	9/27/2022	LUDHIANA	20	50th - 97th	102	3rd - 50th	-	NONE

SR.NO.	MRD NO	BLOCK No.	ORAL INTAKE - As deemed by parents [in last 24hrs; compared to usual days]	Type of Oral Fluids/Feeds received	Vomiting	Intravenous fluid administration	Type of IV fluids received [if known]	Urine output	Diarrhea	HR [bpm]	RR [per min]	SBP	DBP	SpO2	CRT [sec]	Temperature [Farenheit]	CP	PP	Severity of Dehydration	Edema
65	1338684	9	Inadequate	Plain water	Yes	No	-	Decreased	Yes	174	44	60	30	90	>3	95	Feeble	Not palpable	Severe	Not present
66	1333077	9	Inadequate	Plain water	No	No	-	Same	Yes	188	48	90	60	99	>3	99.5	Normal	Bounding	No	Not present
67	1336038	9	Inadequate	Plain water	Yes	No	-	Same	Yes	172	50	96	60	98	>3	99	Normal	Bounding	Severe	Not present
68	1343822	9	Inadequate	Plain water	No	No	-	Same	No	114	36	70	40	99	2-3	95	Normal	Feeble	No	Not present
69	1355143	9	Inadequate	Plain water	Yes	Yes	DNS	Same	Yes	162	52	96	80	84	>3	98.7	Normal	Normal	Some	Not present
70	1355749	9	Inadequate	Plain water	Yes	No	-	Increased	No	146	56	90	60	96	>3	98	Normal	Feeble	No	Not present
71	1340176	9	Adequate	Plain water	No	No	-	Same	No	128	52	84	40	94	<2	97	Normal	Bounding	No	Not present
72	1351526	9	Inadequate	Plain water	Yes	No	-	Same	No	164	42	80	40	99	>3	98	Normal	Normal	No	Not present
73	1356708	10	Adequate	Plain water	No	No	-	Same	No	182	24	120	80	97	<2	98	Normal	Normal	No	Not present
74	1366195	10	Inadequate	Plain water	Yes	No	-	Same	No	68	24	82	52	99	2-3	97.6	Normal	Feeble	No	Not present
75	1355766	10	Adequate	Plain water	No	No	-	Same	No	164	36	90	62	98	<2	98.2	Normal	Normal	No	Not present
76	1359301	10	Inadequate	Plain water	Yes	No	-	Same	Yes	196	APNEA	56	30	76	>3	97	Normal	Not palpable	No	Not present
77	1382221	10	Inadequate	Plain water	Yes	No	-	Same	Yes	198	46	90	60	99	<2	98	Normal	Normal	Some	Not present
78	1388469	10	Inadequate	Plain water	No	No	-	Same	No	156	72	100	60	86	<2	97	Normal	Normal	No	Not present
79	1366036	10	Inadequate	Plain water	Yes	Yes	-	Same	Yes	170	28	90	62	99	2-3	97.6	Normal	Feeble	No	Not present
80	1387289	10	Adequate	Plain water	No	No	-	Same	No	182	APNEA	72	40	82	>3	97	Normal	Not palpable	No	Not present

SR.NO.	MRD NO	BLOCK No.	PREDOMINANT SYSTEM INVOLVED	PRISM III SCORE AT ADMISSION	FINAL PHYSIOLOGICAL IMPRESSION	COMPENSATED SHOCK	Resuscitation fluid [Day 1 - ml/kg]	Resuscitation fluid [Day 2 - ml/kg]
65	1338684	9	Cardiovascular, Gastro-intestinal, Sepsis	21	Hypotensive shock	No	40	20
66	1333077	9	Respiratory, Gastro-intestinal, Neurological, Sepsis, Metabolic	18	Respiratory distress, Compensated shock	Yes	10	-
67	1336038	9	Gastro-intestinal, Metabolic	8	Compensated shock	Yes	20	-
68	1343822	9	Cardiovascular, Sepsis	6	Hypotensive shock	No	40	-
69	1355143	9	Respiratory, Gastro-intestinal, Neurological, Sepsis	16	Respiratory distress, Compensated shock	Yes	40	10
70	1355749	9	Sepsis, Metabolic	20	Hypotensive shock	No	40	-
71	1340176	9	Cardiovascular, Respiratory, Sepsis	3	Hypotensive shock	No	30	-
72	1351526	9	Respiratory, Gastro-intestinal, Metabolic	19	Compensated shock	Yes	30	-
73	1356708	10	Respiratory, Metabolic, Hematological	4	Compensated shock	Yes	10	-
74	1366195	10	Gastro-intestinal, Sepsis, Metabolic	9	Hypotensive shock	No	30	-
75	1355766	10	Sepsis	6	Compensated shock	Yes	10	-
76	1359301	10	Cardiovascular, Gastro-intestinal, Neurological, Sepsis	35	Respiratory failure, Hypotensive shock	No	40	-
77	1382221	10	Gastro-intestinal, Sepsis	7	Respiratory distress, Compensated shock	Yes	70	30
78	1388469	10	Respiratory	12	Respiratory distress, Compensated shock	Yes	20	30
79	1366036	10	Gastro-intestinal, Sepsis	3	Hypotensive shock	No	50	10
80	1387289	10	Neurological, Trauma	30	Respiratory failure, Hypotensive shock, Primary brain/Metabolic dysfunction	No	30	10

SR.NO.	MRD NO	BLOCK No.	Resuscitation fluid [Day 3 - ml/kg]	Resuscitation fluid administered in 3 days [ml/kg]	Other fluids : Na (Meq/Kg)	Other fluids Cl (Meq/Kg)	Other fluids HCO3 (Meq/Kg)	Serum HCO3 value [at admission]	Serum HCO3 value [at 24 hours]	Serum HCO3 value [at 48 hours]	Serum HCO3 value [at 72 hours]	Lowest HC03 value	Diff Serum HCO3 value [at 24 hours]	Diff Serum HCO3 value [at 48 hours]	Diff Serum HCO3 value [at 72 hours]	Serum Na value [at admission]	Serum Na value [at 24 hours]	Serum Na value [at 48 hours]	Serum Na value [at 72 hours]	Highest Na value	Diff Serum Na value [at 24 hours]	Diff Serum Na value [at 48 hours]
65	1338684	9	-	60	18.58	18.58	-	0	15.3	18.6	-	0	-15.3	-18.6	-	139	139	136	-	139	0	-3
66	1333077	9	-	10	10.7	10.7	3	12	15.4	22.2	29.3	12	-3.4	-10.2	-17.3	138	149	152	147	152	11	14
67	1336038	9	-	20	22.55	37.15	-	12.9	10.9	12	21.8	10.9	2	0.9	-8.9	137	134	134	136	137	-3	-3
68	1343822	9	-	40	34.3	34.3	-	23.2	24.9	-	-	23.2	-1.7	-	-	136	140	-	135	140	4	-
69	1355143	9	40	90	34.37	23.3	11.07	13.1	13.1	16.6	-	13.1	0	-3.5	-	130	138	142	-	142	8	12
70	1355749	9	-	40	13.23	13.93	0.16	8.7	21.2	33.8	30.9	8.7	-12.5	-25.1	-22.2	148	154	162	160	162	6	14
71	1340176	9	-	30	9.26	9.26	-	22.2	23.3	-	-	22.2	-1.1	-	-	131	137	142	142	142	6	11
72	1351526	9	-	30	36.71	40.71	3.6	0	15.7	20.7	30.4	0	-15.7	-20.7	-30.4	136	141	134	142	142	5	-2
73	1356708	10	-	10	10.01	10.01	-	24.1	21.9	-	-	21.9	2.2	-	-	141	139	140	140	141	-2	-1
74	1366195	10	-	30	26.1	13.1	13	8.5	11.4	16.7	18.2	8.5	-2.9	-8.2	-9.7	141	147	143	145	147	6	2
75	1355766	10	-	10	35.1	35.1	-	25.8	24.1	28	29.7	24.1	1.7	-2.2	-3.9	138	145	148	148	148	7	10
76	1359301	10	10	50	48.63	47.13	6.6	10	15.3	22.7	26.9	10	-5.3	-12.7	-16.9	121	139	149	151	151	18	28
77	1382221	10	20	120	24.25	27.41	-	13.7	17.6	20.3	27.1	13.7	-3.9	-6.6	-13.4	143	145	147	147	147	2	4
78	1388469	10	-	-	37.1	26.4	10.7	15.6	0	0	0	0	15.6	15.6	15.6	139	145	151	151	151	6	12
79	1366036	10	-	-	21.98	28.28	-	22.8	23	24.3	26.7	22.8	-0.2	-1.5	-3.9	139	142	150	139	150	3	11
80	1387289	10	-	40	8.1	8.1	-	16	16.3	19.3	21.8	16	-0.3	-3.3	-5.8	141	169	166	166	169	28	25

SR.NO.	MRD NO	BLOCK No.	Diff Serum Na value [at 72 hours]	Serum Cl value [at admission]	Serum Cl value [at 24 hours]	Serum Cl value [at 48 hours]	Serum Cl value [at 72 hours]	Peak Cl value	diff Serum Cl value [at 24 hours]	diff Serum Cl value [at 48 hours]	diff Serum Cl value [at 72 hours]	Serum Creatinine value [at admission]	Serum Creatinine value [at 24 hours]	Serum Creatinine value [at 48 hours]	Serum Creatinine value [at 72 hours]	Peak Creatinine value	diff Serum Creatinine value [at 24 hours]	diff Serum Creatinine value [at 48 hours]	diff Serum Creatinine value [at 72 hours]	pH value [at admission]	pH value [at 24 hours]	pH value [at 48 hours]
65	1338684	9	-	92	113	109	-	113	-21	-17	-	2.1	1.33	0.64	-	2.1	0.77	1.46	-	6.81	7.22	7.32
66	1333077	9	9	108	119	112	104	119	-11	-4	4	0.61	0.56	0.78	0.69	0.78	0.05	-0.17	-0.08	7.2	7.3	7.36
67	1336038	9	-1	113	108	111	106	113	5	2	7	0.43	0.4	0.3	0.19	0.43	0.03	0.13	0.24	7.24	7.12	7.2
68	1343822	9	-1	102	107	-	101	107	-5	-	1	0.37	0.42	-	0.3	0.42	-0.05	-	0.07	7.42	7.41	-
69	1355143	9	-	104	101	106	-	106	3	-2	-	0.69	1.17	1.37	-	1.37	-0.48	-0.68	-	7.19	7.25	7.19
70	1355749	9	12	110	116	123	120	123	-6	-13	-10	0.75	0.63	0.51	0.76	0.76	0.12	0.24	-0.01	7.21	7.52	7.61
71	1340176	9	11	100	110	111	109	111	-10	-11	-9	1.09	0.54	0.27	0.23	1.09	0.55	0.82	0.86	7.38	7.4	-
72	1351526	9	6	106	108	107	107	108	-2	-1	-1	0.4	0.48	0.38	0.17	0.48	-0.08	0.02	0.23	6.82	7.28	7.31
73	1356708	10	-1	106	109	114	110	114	-3	-8	-4	0.35	0.42	0.39	0.42	0.42	-0.07	-0.04	-0.07	7.41	7.36	-
74	1366195	10	4	106	114	109	109	114	-8	-3	-3	15.18	12.86	10.58	10.98	15.18	2.32	4.6	4.2	7.11	7.19	7.32
75	1355766	10	10	101	114	112	110	114	-13	-11	-9	0.14	0.11	0.19	0.11	0.19	0.03	-0.05	0.03	7.54	7.36	7.47
76	1359301	10	30	99	107	109	111	111	-8	-10	-12	1.61	1.4	1.2	1.36	1.61	0.21	0.41	0.25	7.16	7.3	7.25
77	1382221	10	4	105	109	116	113	116	-4	-11	-8	0.97	0.37	0.48	0.33	0.97	0.6	0.49	0.64	7.18	7.31	7.36
78	1388469	10	12	106	115	110	109	115	-9	-4	-3	0.92	0.64	1.59	2.76	2.76	0.28	-0.67	-1.84	7.3	6.96	7.06
79	1366036	10	0	109	111	118	108	118	-2	-9	1	0.37	0.36	0.43	0.41	0.43	0.01	-0.06	-0.04	7.37	7.43	7.43
80	1387289	10	25	110	137	138	135	138	-27	-28	-25	0.5	1.23	1.34	0.74	1.34	-0.73	-0.84	-0.24	7.19	7.29	7.37

SR.NO.	MRD NO	BLOCK No.	pH value [at 72 hours]	Lowest pH value	Diff pH value [at 24 hours]	Diff pH value [at 48 hours]	Diff pH value [at 72 hours]	Lactate [at admission]	Lactate [at 24 hours]	Lactate [at 48 hours]	Lactate [at 72 hours]	Maximum Lactate value	Diff Lactate [at 24 hours]	Diff Lactate [at 48 hours]	Diff Lactate [at 72 hours]	Base excess [at admission]	Base excess [at 24 hours]	Base excess [at 48 hours]	Base excess [at 72 hours]
65	1338684	9	-	6.81	-0.41	-0.51	-	15	1	0.5	-	15	14	14.5	-	-24.2	-13.4	-9.1	-
66	1333077	9	7.35	7.2	-0.1	-0.16	-0.15	10	7.6	7.2	4.8	10	2.4	2.8	5.2	-17.4	-13.6	-3.9	7
67	1336038	9	7.4	7.12	0.12	0.04	-0.16	3.4	2.4	0.6	1.9	3.4	1	2.8	1.5	-16.7	-17.3	-18.6	-4.4
68	1343822	9	-	7.41	0.01	-	-	3.5	1.5	-	-	3.5	2	-	-	-2.4	0.6	-	-
69	1355143	9	-	7.19	-0.06	0	-	2.8	3.4	9.8	-	9.8	-0.6	-7	-	-15.6	-16.7	-11.4	-
70	1355749	9	7.51	7.21	-0.31	-0.4	-0.3	15	10.4	3.6	4.3	15	4.6	11.4	10.7	-21.5	-5.8	11.4	8.1
71	1340176	9	-	7.38	-0.02	-	-	3	0.8	-	-	3	2.2	-	-	-3.8	-2.5	-	-
72	1351526	9	7.47	6.82	-0.46	-0.49	-0.65	0.9	1	0.9	2.8	2.8	-0.1	0	-1.9	-30	-13.1	-5.7	7.6
73	1356708	10	-	7.36	0.05	-	-	1.2	1.7	-	-	1.7	-0.5	-	-	-0.5	-3.4	-	-
74	1366195	10	7.31	7.11	-0.08	-0.21	-0.2	1.3	0.7	1	1.1	1.3	0.6	0.3	0.2	-21.2	-19.4	-11.7	-10.2
75	1355766	10	7.45	7.36	0.18	0.07	0.09	1.7	1	1.9	1.5	1.9	0.7	-0.2	0.2	0.6	-1.1	4	6.6
76	1359301	10	7.28	7.16	-0.14	-0.09	-0.12	3	2.8	4.1	2.6	4.1	0.2	-1.1	0.4	-20.9	-13.6	-1.3	3.8
77	1382221	10	7.45	7.18	-0.13	-0.18	-0.27	4.2	1.9	1.5	1.5	4.2	2.3	2.7	2.7	-15.4	-9.7	-5.6	3.8
78	1388469	10	6.91	6.91	0.34	0.24	0.39	8.6	2.2	1.6	1.6	8.6	6.4	7	7	-12.6	-30	-30	-30
79	1366036	10	7.49	7.37	-0.06	-0.06	-0.12	1.4	0.9	0.9	0.7	1.4	0.5	0.5	0.7	-2.2	-3.1	-1.1	1.8
80	1387289	10	7.39	-	-0.1	-0.18	-0.2	4.7	1	1	1.7	4.7	3.7	3.7	3	-11.4	-12.2	-8	-4.4

SR.NO.	MRD NO	BLOCK No.	Most negative Base excess value	diff Base excess [at 24 hours]	diff Base excess [at 48 hours]	diff Base excess [at 72 hours]	Anion gap [at admission]	Anion gap [at 24 hours]	Anion gap [at 48 hours]	Anion gap [at 72 hours]	Diff Anion gap [at 24 hours]	Diff Anion gap [at 48 hours]	Diff Anion gap [at 72 hours]	Renal replacement therapy	Type of RRT	Number of days of RRT	Packed cell transfusion requirement	No. of units of Packed cell transfused	Fresh frozen plasma transfused	No. of units of FFP transfused	Platelets transfused
65	1338684	9	-24.2	-10.8	-15.1	-	47	10.7	8.4	-	36.3	38.6	-	No	-	-	No	-	No	-	No
66	1333077	9	-17.4	-3.8	-13.5	-24.4	18	14.6	17.8	13.7	3.4	0.2	4.3	No	-	-	No	-	No	-	No
67	1336038	9	-18.6	0.6	1.9	-12.3	11.1	15.1	11	8.2	-4	0.1	2.9	No	-	-	No	-	No	-	No
68	1343822	9	-2.4	-3	-	-	10.8	8.1	-	#VALUE!	2.7	-	#VALUE!	No	-	-	No	-	No	-	Yes
69	1355143	9	-16.7	1.1	-4.2	-	12.9	23.9	19.4	-	-11	-6.5	-	No	-	-	No	-	No	-	No
70	1355749	9	-21.5	-15.7	-32.9	-29.6	29.3	16.8	5.2	9.1	12.5	24.1	20.2	No	-	-	No	-	Yes	2	No
71	1340176	9	-2.5	-1.3	-	-	8.8	3.7	#VALUE!	#VALUE!	5.1	#VALUE!	#VALUE!	No	-	-	No	-	No	-	No
72	1351526	9	-30	-16.9	-24.3	-37.6	30	17.3	6.3	4.6	12.7	23.7	25.4	No	-	-	No	-	No	-	No
73	1356708	10	-3.4	2.9	-	-	10.9	8.1	#VALUE!	#VALUE!	2.8	#VALUE!	#VALUE!	No	-	-	Yes	1	No	-	No
74	1366195	10	-21.2	-1.8	-9.5	-11	26.5	21.6	17.3	17.8	4.9	9.2	8.7	Yes	SLED	12	Yes	2	No	-	No
75	1355766	10	-1.1	1.7	-3.4	-6	11.2	6.9	8	8.3	4.3	3.2	2.9	No	-	-	No	-	No	-	No
76	1359301	10	-20.9	-7.3	-19.6	-24.7	12	16.7	17.3	13.1	-4.7	-5.3	-1.1	No	-	-	Yes	1	No	-	No
77	1382221	10	-15.4	-5.7	-9.8	-19.2	24.3	18.4	10.7	6.9	5.9	13.6	17.4	No	-	-	No	-	No	-	No
78	1388469	10	-30	17.4	17.4	17.4	17.4	30	41	42	-12.6	-23.6	-24.6	Yes	PD	<1	Yes	1	No	-	No
79	1366036	10	-3.1	0.9	-1.1	-4	7.2	8	7.7	4.3	-0.8	-0.5	2.9	No	-	-	No	-	No	-	No
80	1387289	10	-12.2	0.8	-3.4	-7	15	15.7	8.7	9.2	-0.7	6.3	5.8	No	-	-	Yes	2	No	-	No

SR.NO.	MRD NO	BLOCK No.	No. of units of RDP transfused	No. of units of SDP transfused	Albumin transfusion	Number of times Albumin transfused	Need for Mechanical ventilation	Mechanical ventilation - Duration [days]	Non-Invasive Ventilation	Non-Invasive Ventilation : Duration [days]	Need for Inotropes	Inotropes	Dopamine [Day1] - mcg/kg/min	Dopamine [Day2] - mcg/kg/min	Dopamine [Day3] - mcg/kg/min	Dobutamine [Day1] - mcg/kg/min
65	1338684	9	-	-	No	-	No	-	No	-	No	-	-	-	-	-
66	1333077	9	-	-	No	-	No	-	No	-	Yes	dobutamine, epinephrine, norepinephrine	-	-	-	-
67	1336038	9	-	-	No	-	No	-	No	-	No	-	-	-	-	-
68	1343822	9	3	-	No	-	No	-	Yes	2	Yes	norepinephrine	-	-	-	-
69	1355143	9	-	-	Yes	1	Yes	2	No	-	Yes	epinephrine, norepinephrine	-	-	-	-
70	1355749	9	-	-	No	-	Yes	16	Yes	3	Yes	norepinephrine, vasopressin	-	-	-	-
71	1340176	9	-	-	No	-	No	-	No	-	Yes	norepinephrine	-	-	-	-
72	1351526	9	-	-	No	-	Yes	1	No	-	Yes	norepinephrine	-	-	-	-
73	1356708	10	-	-	No	-	No	-	No	-	No	-	-	-	-	-
74	1366195	10	-	-	No	-	Yes	17	Yes	3	No	-	-	-	-	-
75	1355766	10	-	-	No	-	Yes	3	No	-	Yes	norepinephrine	-	-	-	-
76	1359301	10	-	-	Yes	1	Yes	5	No	-	Yes	dobutamine, epinephrine, norepinephrine	-	-	-	-
77	1382221	10	-	-	No	-	No	-	Yes	3	Yes	norepinephrine	-	-	-	-
78	1388469	10	-	-	Yes	1	Yes	3	No	-	Yes	epinephrine, norepinephrine, vasopressin	-	-	-	-
79	1366036	10	-	-	No	-	No	-	Yes	3	Yes	norepinephrine	-	-	-	-
80	1387289	10	-	-	No	-	Yes	23	Yes	7	No	-	-	-	-	-

SR.NO.	MRD NO	BLOCK No.	Dobutamine [Day2] - mcg/kg/min	Dobutamine [Day3] - mcg/kg/min	Epinephrine [Day1] - mcg/kg/min	Epinephrine [Day2] - mcg/kg/min	Epinephrine [Day3] - mcg/kg/min	Nor-epinephrine [Day1] - mcg/kg/min	Nor-epinephrine [Day2] - mcg/kg/min	Nor-epinephrine [Day3] - mcg/kg/min	Milrinone [Day1] - mcg/kg/min	Milrinone [Day2] - mcg/kg/min	Milrinone [Day3] - mcg/kg/min	Vasopressin [Day1] - U/kg/min	Vasopressin [Day2] - U/kg/min	Vasopressin [Day3] - U/kg/min	VIS [Day 1]	VIS [Day 2]	VIS [Day 3]	Maximum MAP [day 1]	Minimum MAP [day 1]
65	1338684	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	1333077	9	-	10	0.2	0.2	-	0.4	0.6	0.1	-	-	-	-	-	-	-	-	-	-	-
67	1336038	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68	1343822	9	-	-	-	-	-	0.4	0.2	-	-	-	-	-	-	-	-	-	-	68	50
69	1355143	9	-	-	0.3	0.5	-	0.4	0.3	-	-	-	-	-	-	-	-	-	-	64	42
70	1355749	9	-	-	-	-	-	0.5	0.4	0.2	-	-	-	0.06	-	-	-	-	-	108	78
71	1340176	9	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	78	61
72	1351526	9	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-
73	1356708	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	1366195	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75	1355766	10	-	-	-	-	-	-	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-
76	1359301	10	-	8	0.2	0.3	0.2	-	0.5	0.7	-	-	-	-	-	-	-	-	-	64	43
77	1382221	10	-	-	-	-	-	0.2	0.2	0.1	-	-	-	-	-	-	-	-	-	70	55
78	1388469	10	-	-	-	-	0.3	0.5	0.7	0.8	-	-	-	0.06	0.09	0.09	-	-	-	84	49
79	1366036	10	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	66	53
80	1387289	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SR.NO.	MRD NO	BLOCK No.	Maximum MAP [day 2]	Minimum MAP [day 2]	Maximum MAP [day 3]	Minimum MAP [day 3]	Duration of Inotropes [days]	Maximum Inotropic score	KDIGO STAGE [at admission]	KDIGO STAGE [after 72 hours]	ICU admission date	Number of days in ICU	Patient outcome	If died ; death	Date of Hospital discharge or death	Duration of hospital stay
65	1338684	9	-	-	-	-	-	-	3	1	7/10/2022	3	Improved & Discharged	-	7/14/2022	4
66	1333077	9	-	-	-	-	6	80	1	1	7/1/2022	6	DAMA	-	7/6/2022	5
67	1336038	9	-	-	-	-	-	-	0	0	7/6/2022	3	Improved & Discharged	-	7/12/2022	6
68	1343822	9	74	56	-	-	2	40	0	0	7/19/2022	5	Improved & Discharged	-	7/27/2022	8
69	1355143	9	68	44	-	-	2	80	1	-	8/6/2022	3	Died	within 72hrs	8/8/2022	2
70	1355749	9	111	81	115	76	5	650	2	2	8/7/2022	24	Improved & Discharged	-	9/3/2022	27
71	1340176	9	-	-	-	-	1	20	2	0	7/12/2022	7	Improved & Discharged	-	7/20/2022	8
72	1351526	9	-	-	-	-	1	20	0	0	7/31/2022	3	Improved & Discharged	-	8/8/2022	8
73	1356708	10	-	-	-	-	-	-	0	0	8/9/2022	5	Improved & Discharged	-	8/14/2022	5
74	1366195	10	-	-	-	-	-	-	3	3	8/25/2022	31	DAMA	-	10/10/2022	47
75	1355766	10	54	42	58	46	20	2	0	0	8/8/2022	8	Improved & Discharged	-	8/25/2022	18
76	1359301	10	68	46	64	48	5	98	3	3	8/13/2022	5	Died	>72hrs of hospital admission	8/17/2022	4
77	1382221	10	76	62	72	68	4	20	1	0	9/19/2022	5	Improved & Discharged	-	9/28/2022	9
78	1388469	10	82	65	71	58	3	1010	1	3	9/28/2022	4	Died	>72hrs of hospital admission	10/1/2022	3
79	1366036	10	72	58	78	70	1	20	0	0	8/24/2022	6	Improved & Discharged	-	9/8/2022	15
80	1387289	10	-	-	-	-	-	-	0	1	9/27/2022	34	Improved & Discharged	-	11/27/2022	61

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The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Rashmi Kapoor**, a student of your college for **MD Paediatrics** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Comparison of a balanced electrolyte solution with normal saline as resuscitation fluid in children.

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The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

89. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
90. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN

PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MD

In

PEDIATRICS

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

MARCH, 2021

DR. RASHMI KAPOOR

DEPARTMENT OF PEDIATRICS
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LUDHIANA

ABSTRACT OF PLAN OF THESIS

TITLE	COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN
DEGREE	MD Pediatrics
NAME OF THE CANDIDATE	Dr. Rashmi Kapoor
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INSTITUTION	Dayanand Medical College & Hospital, Ludhiana
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Introduction: An ideal fluid is the one that produces a predictable and sustained increase in intravascular volume. There have been increasing concerns with the use of 0.9% saline due to its supra-physiological concentrations of sodium and chloride. The use of NS is associated with hyperchloremic metabolic acidosis; so, Plasma-lyte being a chloride restrictive fluid as well as containing sodium acetate and gluconate which are bicarbonate producing salts will help in countering hyperchloremia and acidosis component respectively. A causal link between hyperchloremia and acute kidney injury (AKI) has also been hypothesized. Previous studies have primarily been done on adult population with very scanty information in pediatric age group.

Aim of Study: To compare a balanced electrolyte solution with normal saline as resuscitation fluid in children

Materials & methods: A prospective open-label randomized control trial will be done on children from 1 month to 18 years of age presenting to the pediatric emergency of DMCH, Ludhiana and requiring fluid resuscitation. Any child requiring intravenous fluid bolus[s] within 6 hours of admission will be randomized to receive either a balanced electrolyte solution [Plasma-Lyte] or NS as resuscitative fluid based on the sequence generated by a computerized random number table. Following this; outcome will be compared between the two groups by appropriate statistical method.

Outcome : Primary outcome : Change in serum bicarbonate when a balanced solution [Plasma-Lyte] is compared with an unbalanced electrolyte solution [NS]. Secondary outcomes: Change in serum electrolytes, acid-base balance from baseline, incidence of normal anion gap metabolic acidosis, AKI at 72 hrs (using KDIGO criteria) and efficacy measures like impact on ionotropic score, total fluid requirement, percentage fluid overload up till 72 hrs, proportion of in-hospital all-cause mortality and length of ICU stay.

Statistical Analysis – t-test for two independent samples will be used to see the difference between the two groups.

Clinical Significance: The study will help us to assess the safety as well as efficacy of a balanced electrolyte solution [Plasma-Lyte] in terms of occurrence and progression of electrolyte/acid-base abnormalities, AKI when it replaces NS as a resuscitation fluid.

Keywords: Children, Normal Saline, Plasma-Lyte, Resuscitation Fluid.

(Signature)	(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN"** exist in the Department of Pediatrics, DMC&H, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis is genuine and is collected by the candidate herself under our supervision and guidance.

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APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
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Topic of Thesis	COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN
Likely date of appearing in PG examination	June, 2023
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Approved: Yes / No

Dr. Sandeep Puri
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BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

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2	NAME OF THE INSTITUTE	Dayanand Medical College and Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	MD Pediatrics
4	DATE OF ADMISSION OF COURSE	25th July, 2020
5	TITLE OF THE TOPIC	COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Crystalloid fluids are the most utilised intravenous fluids in the world. Presently, there are a large number of different types of crystalloid fluids available for use in hospitals. However, there is a growing concern regarding paucity of data on their relative safety. There is an emerging interest to classify and to investigate the comparative effectiveness of crystalloid fluids based on buffered/balance and unbuffered/unbalanced fluid types 0.9% saline is the predominant unbuffered crystalloid fluid and contains supraphysiological concentrations of chloride.

When used in significant volumes, 0.9% saline leads to a foreseeable hyperchloremic metabolic acidosis. The clinical consequence of this metabolic change is uncertain and use of these crystalloid fluids have an influence on renal functioning, hemostasis and blood transfusion requirements

Animal and experimental data have reported that 0.9% saline may be associated with altered renal perfusion, reduced glomerular filtration and may affect the release of proinflammatory cytokines. Few observational studies report that the use of high chloride containing fluid might be associated with AKI and an increased need for renal replacement therapy. However, there is no significant evidence from prospective interventional research linking the use of unbuffered crystalloid fluid and impaired renal function.

There is supporting evidence from in-vitro studies suggesting that crystalloid fluids have a differing effect on hemostasis depending on the amount of volume replacement required. There have been few in-vivo studies on this topic; however, there is evidence from observational studies to suggest that there is less need for blood products in patients that only received buffered fluids compared to those that received 0.9% saline. Interventional studies have been largely conducted in surgical populations and there is evidence in high-risk subgroups of patients that the use of 0.9% saline may be

associated with increased blood loss volume and increased requirement for platelets.

There has been limited evidence exploring the effect of different crystalloid fluids on gastrointestinal function. Animal studies have reported that the use of crystalloid fluids may be associated with impact on gastrointestinal system such as an acute hydrostatic gut oedema and slowing of intestinal transit time. Observational data suggests that 0.9% saline may be associated with a lower rate of minor gastrointestinal complications (such as nausea, vomiting and ileus) when compared to buffered crystalloid fluid. However, there is evidence from interventional studies reporting that buffered fluids may be associated with reduced post-operative vomiting and improved gastric mucosal perfusion.

Intravenous fluids are one of the most common interventions used in acute medicine. Although crystalloid fluids are the most common type of intravenous fluid used in ICUs there have been limited prospective interventional trials assessing the comparative effectiveness of buffered vs. unbuffered crystalloid fluids in critically unwell children.

An ideal fluid is the one that produces a predictable and sustained increase in intravascular volume. Crystalloids possess a chemical composition close to that of extracellular fluids and get completely metabolized and excreted. As critically ill children present a challenge of developing variable degrees of fluid and electrolyte imbalances; so, there has been a lot of debate around the ideal resuscitation fluid for use in different clinical entities like septic shock and DKA.[1] Normal saline (NS), since long, has been considered as an ideal resuscitation fluid but, recently increasing concerns with the use of 0.9% saline mainly attributed to its supra-physiological concentrations of sodium and chloride have emerged. Some reports have hypothesized a causal link between hyperchloremia and acute kidney injury (AKI)[2-3]. Preliminary studies undertaken by different workers have provided evidence to support Plasma-Lyte being superior to NS. In a single-centre, prospective, open-label, pilot study done on 1500 critically ill patients, the implementation of a chloride-restrictive strategy that

included avoiding NS was associated with a significant decrease in the incidence of acute kidney injury (AKI) and the need for renal replacement therapy (RRT). Extended analysis of almost 3000 patients done over 1-year period revealed an overall beneficial impact on AKI of restricting chloride-rich fluids. Similar studies have been done in children, however, these studies have been done on specific entities *per se* and were undertaken using small sample sizes necessitating the need for a larger and more generalized study for elucidating the advantages offered by Plasma-Lyte viz-á-viz the conventionally used NS. The present study has been planned with the objective of evaluating Plasma-Lyte as an alternative to NS as a resuscitative fluid affecting patient outcome in critically ill children. The outcomes to be studied are change in serum bicarbonate S.Chloride, S.Sodium, pH, Base excess, S.Lactate from baseline [at admission] when compared to values at 24 hrs and 72 hrs and its peak/worst value, incidence of normal anion gap metabolic acidosis, AKI at 72 hrs (using KDIGO criteria) and efficacy measures like impact on ionotropic score, total fluid requirement, percentage fluid overload up till 72 hrs, proportion of in-hospital all-cause mortality and length of ICU stay when a balanced solution [Plasma-Lyte] is compared with an unbalanced electrolyte solution [NS] as a resuscitative fluid in children

6.2 REVIEW OF LITERATURE

Globally, there are variations in the resuscitative intravenous fluids used for treatment of clinically ill patients. The type and choice depends primarily on local availability, marketing and cost of fluid.[4-5] Recently there has been an increase interest in the comparative efficacy of different intravenous fluids when compared to use of 0.9% saline in critically ill patients.[4,6]

Crystalloid fluids are a heterogeneous group of aqueous solutions containing varying concentrations of inorganic ions and small organic molecules.[7] These have evolved since first being used during the cholera epidemic in the 1830s and they are commonly classified on the basis of their main solute (e.g. sodium chloride, glucose, etc.) or tonicity compared to human plasma (isotonic, hypotonic, hypertonic). The variable electrolyte composition of each crystalloid fluid contributes to the ability of infused fluid to stay within the intravascular space and resulting biological properties. There has recently been a push to further distinguish fluids into physiologically buffered/balanced or physiologically unbuffered/unbalanced fluids.[8]

Universally, crystalloid solutions are used for the resuscitation of critically ill patients in the intensive care unit. The most commonly used among the various crystalloid solutions is sodium chloride in the form of “normal saline” (NS). However, NS has some limitations; the most worrisome being hyperchloremic metabolic acidosis attributed to its high chloride content compared to normal plasma (95 – 110 mmol/L)[5,9-10].

Among different crystalloids that are available (0.9% saline (NS), Ringer’s Lactate (RL), and Plasma-Lyte) and commonly being used, NS has the advantage of being available in various combinations (N/2, N/3, N/5 and DNS with 5% dextrose). It is also cost-effective making it ideal for routine use. However, there has been a lot of debate around the ideal resuscitation fluid for use in septic shock and DKA.[7] A study conducted by Edwards and Mason[11] in 2018 suggested that in children Plasma-Lyte is equivalent to or possible superior in some situations to alternative intravenous fluids.

Williams et al.[12] conducted a double-blind, parallel-arm, investigator-initiated, randomized controlled trial to compare 0.9% saline with Plasma-Lyte-A as initial fluid in pediatric DKA. The study was done in a tertiary care, teaching, and referral hospital in India in children (> 1 month–12 years) with DKA as defined by ISPAD. Children with cerebral edema or known chronic kidney/liver disease or who had received pre-referral fluids and/or insulin were excluded. Sixty-six children were randomized to receive either Plasma-Lyte (n = 34) or 0.9% saline (n = 32). They concluded that the incidence of new or progressive acute kidney injury (AKI) and resolution of AKI were similar in both Plasma-Lyte and 0.9% Saline with respect to resolution of DKA, need for RRT, mortality, and lengths of PICU and hospital stay.

Yunos and co-authors[13] in a single-centre, prospective, open-label, sequential-period pilot study of about 1500 critically ill patients studied the overall impact of restricting chloride-rich fluids that included avoiding NS. They reported that the implementation of a chloride-restrictive strategy in a tertiary ICU was associated with a significant decrease in the incidence of AKI and use of RRT. The extended analysis of about 3000 patients over a 1-year period showed that the overall beneficial impact on AKI of restricting chloride-rich fluids remained[14]. Marttinen et al[15] in the Finnish Acute Kidney Injury (FINNAKI) hypothesized that higher plasma Chloride is associated with an increased risk for the development of AKI. They analysed chloride values during the ICU stay of 445 patients. They showed higher time-weighted mean chloride levels that were independently associated with an increased risk of AKI. Based on the measured chloride values, 350 of 445 patients had hyperchloremia and 48 severe hyperchloremia. A total of 217 of 445 patients developed AKI. Hence, more than three out of four critically ill patients had hyperchloremia and 1 out of 10 had its severe form.

Jadad et al. while assessing the quality of reports of randomized clinical trials: Is blinding necessary? reported that in children with gastroenteritis those given Plasma-Lyte had statistically significant greater increases in serum bicarbonate from baseline than did the

0.9% NaCl group. Both treatment groups had received similar fluid volumes. The Plasma-Lyte group had a significantly better dehydration scores at 2 hr and a non-significant better score at 4 hr.[16] Shaw et al. in their study demonstrated an association between IV chloride load and mortality in hospitalized patients with SIRS, independent of total fluid volume. The balance of probabilities appeared to be shifting away from high-chloride toward low-chloride solutions for first-line fluid resuscitation of patients with SIRS.[17]

Verma and co-workers[18] (2016) conducted a double blind, randomised controlled pilot study to assess the biochemical and physiological effects along with the feasibility and safety of resuscitation with NS versus Plasma-Lyte 148 in critically ill patients. They took daily Base Excess as the primary outcome and incidence of AKI and various other parameters as secondary outcomes. The study concluded that PL-148 did not lead to a significant increase in Base Excess values in critically ill patients requiring fluid resuscitation, but decreased peak chloride concentrations.

Emrath et al. reviewed the data from the Pediatric Health Information System (PHIS) database from 2004 to 2012 to evaluate outcomes in patients receiving balanced fluids for resuscitation in pediatric severe sepsis.[19] Children receiving balanced fluids for resuscitation in the first 24 and 72 hours of treatment were compared to those receiving unbalanced fluids. A total of 36908 patients fulfilled the requirements criteria for analysis. 2398 patients received exclusively balanced fluids at 24 hours and 1,641 at 72 hours. After matching, the 72-hour balanced fluids group had lower mortality (12.5% vs 15.9%), lower prevalence of acute kidney injury (16.0% vs 19.2%) and fewer vasoactive infusion days (3 vs 3.3 days) when compared with the unbalanced fluids group. They concluded that exclusive use of balanced fluids in pediatric severe sepsis patients for the first 72 hours of resuscitation was associated with improved survival, decreased prevalence of acute kidney injury, and shorter duration of vasoactive infusions when compared with exclusive use of unbalanced fluids.

6.3 AIMS AND OBJECTIVES OF THE STUDY

To compare a balanced electrolyte solution with normal saline as resuscitation fluid in children presenting to pediatric emergency

1. Primary outcome: To assess Change in serum bicarbonate.

2. Secondary outcomes: Change in serum electrolytes, acid-base balance, incidence of normal anion gap metabolic acidosis, AKI at 72 hrs (using KDIGO criteria) and efficacy measures like impact on ionotropic score, total fluid requirement, percentage fluid overload up till 72 hrs, proportion of in-hospital all-cause mortality and length of ICU stay.

MATERIALS AND METHODS

Study site - The study would be carried out in Department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana.

Settings – Pediatric department in a tertiary care hospital. Children between the age of 1 month to 18 years presenting to the pediatric emergency of Dayanand Medical College and Hospital, Ludhiana will be enrolled into the randomized control trial. Any child presenting to Pediatric emergency and requiring resuscitation with intravenous fluid bolus[s] within 6 hours of admission will be randomized to receive either Plasma-Lyte or Normal saline as resuscitative fluid based on the sequence generated by a computerized random number table. Following this; the outcome variables as mentioned above will be compared between the two groups by appropriate statistical method.

SOURCE OF DATA

A prospective open label randomized control trial will be done on children from 1 month to 18 years of age who present to the pediatric emergency and require fluid boluses within first 6 hours of hospital admission

METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

- Children aged 1 month to 18 years
- Initiation of fluid boluses of atleast 10ml/kg within first 6 hours of hospital admission

EXCLUSION CRITERIA

- Known case of chronic kidney disease/ liver disease
- Refusal to give an informed consent

NUMBER OF CASES: 80 patients [40 in each group].

SAMPLE SIZE CALCULATION

The objective of the study is to compare a balanced electrolyte solution [Plasma-Lyte] with normal saline (NS) as resuscitation fluid in children presenting to pediatric emergency

Outcome parameter = Change in serum bicarbonate from baseline [at admission] when compared to values at 24 hrs, 48 hrs and 72 hrs as well as its worst value

The formula used is as under:

$n = (\sigma 1\ 2 + \sigma 2\ 2)\ (Z\ \alpha + Z\ \beta)\ 2\ /(\ m\ 1 – m\ 2\ )\ 2$

Where,

Zα = Value of standard normal variate corresponding to α level of significance

Z β = The standard normal deviate for desired power

m = Average

σ = Standard deviation

Assumptions:

From the study conducted by Allen, et al[20], values for serum bicarbonate from baseline in Plasma-Lyte and Normal saline Group in children with moderate to severe dehydration secondary to acute gastroenteritis (AGE).

Mean change of serum bicarbonate from baseline in Plasma-Lyte Group (m 1) = 1.6

Mean change of serum bicarbonate from baseline in Normal saline Group (m 2) = 0

Coefficient of variation = 150%

Standard deviation of serum bicarbonate (σ 1) = 2

Version 1.0 dated 03/ Dec/2020

Standard deviation of serum bicarbonate (σ 2) = 2

Change in the parameters (m1– m 2) = 1.6

With the above assumptions the sample size for 95% confidence level & amp; 80% power works out 40 in each group.

Statistical Analysis: Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing

categorical data, Chi square ($\chi 2$) test will be performed and exact test will be used when the expected frequency is less than 5. A probability value (p value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

INVESTIGATIONS REQUIRED IN PATIENTS

- RFT
- Blood gas analysis

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached herewith

LIST OF REFERENCES

1) McFarlane C, Lee A. A comparison of Plasmalyte 148 and 0.9% saline for intra-operative fluid replacement. Anaesthesia. 1994;49:779-81.
2) Mahler SA, Conrad SA, Wang H, Arnold TC. Resuscitation with balanced electrolyte solution prevents hyperchloremic metabolic acidosis in patients with diabetic ketoacidosis. The American journal of emergency medicine. 2011;29:670-4.
3) Park M, Calabrich A, Maciel AT, Zampieri FG, Taniguchi LU, Souza CE, et al. Physicochemical characterization of metabolic acidosis induced by normal saline resuscitation of patients with severe sepsis and septic shock. Revista Brasileira de terapia intensiva. 2011;23:176-82.
4) Finfer S, Liu B, Taylor C, Bellomo R, Billot L, Safe Trips Investigators. Resuscitation fluid use in critically ill adults: an international cross-sectional study in 391 intensive care units. Critical care. 2010;14:R185.
5) Myburgh JA, Mythen MG. Resuscitation fluids. N Engl J Med 2013;369:1243-51.
6) Myburgh JA, Finfer S, Bellomo R, Billot L, Cass A, Gattas D, et al. Hydroxyethyl starch or saline for fluid resuscitation in intensive care. New England Journal of Medicine. 2012;367:1901-11.
7) Lira A, Pinsky MR. Choices in fluid type and volume during resuscitation: impact on patient outcomes. Annals of Intensive Care. 2014;4:38.
8) Burdett E, Dushianthan A, Bennett-Guerrero E, Cro S, Gan TJ, Grocott MP, et al. Perioperative buffered versus non-buffered fluid administration for surgery in adults. Cochrane Database of Systematic Reviews. 2012:CD004089.
9) Wakim KG. Normal 0.9% Salt Solution Is Neither Normal Nor Physiological. JAMA. 1970;214:1710.
10) Yunos NA, Bellomo R, Story D, Kellum J. Bench-to-bedside review: chloride in critical illness. Critical care. 2010;14:226.

11) Edwards ED, Mason BW. Plasma-lyte for intravenous fluid maintenance, replacement or resuscitation as an alternative to other intravenous fluids in paediatric patients: A systematic review. J Pedia Health Care Med. 2018;1:23-26.
12) Williams V, Jayashree M, Nallasamy K, Dayal D, Rawat A. 0.9% saline versus Plasma-Lyte as initial fluid in children with diabetic ketoacidosis (SPinK trial): a double-blind randomized controlled trial. Critical Care. 2020;24:1-10.
13) Bellomo R, Hegarty C, Story D, Ho L, Bailey M. Association between a chloride-liberal vs chloride-restrictive intravenous fluid administration strategy and kidney injury in critically ill adults. Jama. 2012;308:1566-72.
14) Bellomo R, Glassford N, Sutcliffe H, Lam Q, Bailey M. Chloride-liberal vs. chloride-restrictive intravenous fluid administration and acute kidney injury: an extended analysis. Intensive care medicine. 2015;41:257-64.
15) Marttinen M, Wilkman E, Petäjä L, Suojaranta-Ylinen R, Pettilä V, Vaara ST. Association of plasma chloride values with acute kidney injury in the critically ill–a prospective observational study. Acta anaesthesiologica Scandinavica. 2016;60:790-9.
16) Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJ, Gavaghan DJ, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary?. Controlled clinical trials. 1996;17:1-2.
17) Shaw AD, Raghunathan K, Peyerl FW, Munson SH, Paluszkiewicz SM, Schermer CR. Association between intravenous chloride load during resuscitation and in-hospital mortality among patients with SIRS. Intensive care medicine. 2014;40:1897-905.
18) Verma B, Luethi N, Cioccari L, Lloyd-Donald P, Crisman M, Eastwood G, et al. A multicentre, randomised controlled pilot study of fluid resuscitation with saline or Plasma-Lyte 148 in critically ill patients. Critical Care and Resuscitation. 2016;18:205-12.
19) Emrath E, Travers C, McCracken C, Fortenberry J, Hebbar K. resuscitation with balanced fluids is associated with improved

survival in pediatric severe sepsis. Critical care medicine. 2015;43:263-4.

20) Allen CH, Goldman RD, Bhatt S, Simon HK, Gorelick MH, Spandorfer PR, et al. A randomized trial of Plasma-Lyte A and 0.9 % sodium chloride in acute pediatric gastroenteritis. BMC Pediatr. 2016;16:117.

GROUP [NS / PLASMA-LYTE] SERIAL NO. IN GROUP _____

PATIENT DEMOGRAPHICS:

Name

Age

Sex

MRD

Date of admission: ___/____/_____

City of Residence: _____

Weight:____kilograms ____ centiles

Height:____centimeters ____ centiles

BMI: ___

Co-Morbidities at admission Yes/No

Chronic respiratory disease	
Chronic cardiovascular disease	
Immunosuppression by disease	
Immunosuppression by therapy	
Hepatic failure	
Cirrhosis	
Malignancy	

STATUS PRIOR TO ADMISSION

Oral intake

As deemed by parents [in last 24hrs; compared to usual days]: Adequate Inadequate

Type of Oral Fluids/Feeds received

- Plain water
- ORS [Standard]
- Homemade fluids
- Juices/ Carbonated drinks

Vomiting: Yes No

Intravenous fluid administration: Yes No

Type of IV fluids received [if known]

Urine output: Increased Same Decreased

Diarrhea: Yes No

Signature of Candidate **Signature of Supervisor**

GROUP [NS / PLASMA-LYTE] SERIAL NO. IN GROUP _____

STATUS AT ADMISSION

Vitals:

HR -:

RR -:

Blood pressure -:

SpO_2 -:

CRT -:

Temperature -:

CP/PP -:

Severity of Dehydration :

No dehydration

Some dehydration

Severe dehydration

Edema: Present Not present

PROVISIONAL DIAGNOSIS AT ADMISSION :

PREDOMINANT SYSTEM INVOLVED	YES/NO	OPERATIVE [YES/NO]
Cardiovascular		
Respiratory		
Gastro-intestinal		
Neurological		
Sepsis		
Trauma		
Metabolic		
Hematological		
Others [Specify]		

PRISM III SCORE AT ADMISSION

Signature of Candidate **Signature of Supervisor**

GROUP [NS / PLASMA-LYTE] **SERIAL NO. IN GROUP** _____

FINAL PHYSIOLOGICAL IMPRESSION

- Stable
- Respiratory distress
- Respiratory failure
- Compensated shock
- Hypotensive shock
- Cardiopulmonary failure
- Primary brain/ Metabolic dysfunction

RESUSCITATION FLUID ADMINISTERED : NS / PLASMA-LYTE

ml/kg	DAY 1	DAY 2	DAY 3
1st bolus			
2nd bolus			
3rd bolus			
...			
TOTAL VOLUME			
Total volume [ml/kg] administered in 3 days :			

OUTCOMES

BLOOD TESTS RESULTS		**At admission**	**24 hrs**	**48 hrs**	**72 hrs**	
Serum HCO_3	**Value**					Lowest HCO_3
	Δ HCO_3					
Serum Na^+	**Value**					Highest Na^+
	Δ Na^+					
Serum Cl^-	**Value**					Peak Cl^-
	Δ Cl^-					
Creatinine	**Value**					Peak Creatinine
	Δ Creatinine					
pH	**Value**					Lowest pH
	Δ pH					
Lactate						Max. Lactate
Base excess						Most negative BE
Anion gap						

Signature of Candidate **Signature of Supervisor**

GROUP [NS / PLASMA-LYTE] **SERIAL NO. IN GROUP** _____

CLINICAL			
Renal replacement therapy	Yes	No	
Type & Days of RRT			
Packed cell transfusion requirement	Yes	No	No. of units
Fresh frozen plasma	Yes	No	No. of units
Platelet transfusion	Yes	No	No. of units
Albumin transfusion	Yes	No	No. of times
Need for inotropes	Yes	No	Duration
Maximum Inotropic Score			
Need for mechanical ventilation	Yes	No	Duration
Non-invasive ventilation [NIV]	Yes	No	Duration

VASOACTIVE INOTROPIC SCORE [VIS]

Vasoactive inotrope		DAY 1	DAY 2	DAY 3
Dopamine dose [µg/kg/min]				
Dobutamine dose [µg/kg/min]				
100 x Epinephrine dose [µg/kg/min]				
10 x Milrinone dose [µg/kg/min]				
10,000 x Vasopressin dose [U/kg/min]				
100 x Norepinephrine dose [µg/kg/min]				
Total VIS				
Maximum VIS				
MAP	Max.			
	Min.			
HR	Max.			
	Min.			

VIS = Dopamine dose [µg/kg/min] + Dobutamine dose [µg/kg/min] + 100 x Epinephrine dose [µg/kg/min] + 10 x Milrinone dose [µg/kg/min] + 10,000 x Vasopressin dose [U/kg/min] + 100 x Norepinephrine dose [µg/kg/min]

Percentage Fluid Overload (%FO)

	DAY 1	DAY 2	DAY 3
Intake (L)			
Output (L)			
% FO			
Cumulative % FO			

$$\%\,FO = \frac{\text{Intake(L)} - \text{Output (L)}}{\text{Body weight (Kg)}} \times 100$$

Signature of Candidate **Signature of Supervisor**

GROUP [NS / PLASMA-LYTE] SERIAL NO. IN GROUP _____

KDIGO CRITERIA

STAGE	SERUM CREATININE	URINE OUTPUT
1	1.5–1.9 times baseline OR ≥0.3 mg/dl increase	<0.5 ml/kg/h for 6–12 hours
2	2.0–2.9 times baseline	<0.5 ml/kg/h for >12 hours
3	>3.0 times baseline OR Increase in serum creatinine to ≥ 4.0 mg/dl OR Initiation of renal replacement therapy OR In patients <18 years, decrease in eGFR to <35 ml/min per 1.73 m^2	<0.3 ml/kg/h for >24 hours OR Anuria for > 12 hours

KDIGO STAGE	AT ADMISSION	ON DAY 4 [after 72 hrs]

Number of days in the hospital: _____

ICU admission date: ___/____/_____

Number of days in the ICU: _____

Patient outcome: Died Improved & Discharged DAMA

If died ; death within 72hrs / >72hrs of hospital admission

Date of Hospital discharge or death: ___/____/_____

Signature of Candidate Signature of Supervisor

Informed Consent Form to participate in Study

STUDY TITLE

COMPARISON OF A BALANCED ELECTROLYTE SOLUTION WITH NORMAL SALINE AS RESUSCITATION FLUID IN CHILDREN

INTRODUCTION

Sick children with poor circulation and. Low blood pressure need some life saving fluids [in addition to other measures] to stabilize the child. Normal saline [NS] and Plasma-lyte [PL] are two such fluids which are currently in use all over the world.

WHY THIS STUDY IS BEING DONE?

Both NS & PL are similar in their function [which is to normalize the blood pressure and BP in a sick child] but are different in their overall composition and. We want to compare if there is a difference in the effectiveness and safety with regard to certain parameters between the two fluids.

HOW THE STUDY WILL BE DONE?

Your child will receive one of the two fluids under consideration after taking due consent and will be monitored with regard to certain laboratory parameters which are routinely done to monitor progress of child during treatment.

WHAT IS THE TIME DURATION FOR WHICH PATIENT WILL BE ADMINISTERED TREATMENT AS PER STUDY?

The fluid will be administered once at admission and then if needed subsequently within first 3 days of admission and results of blood tests will be noted on a structured proforma.

BENEFITS OF THE STUDY?

The study will contribute in the enhancement of scientific knowledge regarding the differences in terms of effectiveness and safety between the two fluids

RISKS INVOLVED/ WHEN WILL STUDY BE DISCONTINUED?

As such both fluids are safe, currently in use all over the world and so, doesn't impose any risks to the patient on participation in study. The study fluids don't have any foreseeable risks which would warrant discontinuation of study.

COMPENSATION PAID IN CASE OF ANY HARM.

The study doesn't pose any harm or threat to patient as the fluids used in study are currently in use and there is no evidence of risks over the benefit for the condition where they are being used here.

CONFIDENTIALITY OF THE DATA

It is insured that the identity and other data/ treatment details and particulars of the child will not be shared with any other person/authority. The participation in the study is voluntary and the child /LAR can withdraw from the study anytime.

VOLUNTARY PARTICIPATION

Taking part in this research study is voluntary. We urge you to discuss any questions about this study with our investigators. Before you decide to take part, please take as much time as you need to ask any question and discuss this study with anyone in person or with family, friends or your personal physician or other health professional. If you choose to take part, you have the right to withdraw at any time. If you decide not to participate or if you decide to stop taking part in the research at a later date, there will be no penalty or loss of benefits to which you are otherwise entitled.

CONTACT INFORMATION FOR QUESTIONS OR CONCERNS

You have the right to ask any questions you may have about this research. If you have questions, complaints, or concerns, contact **Principal Investigator** ***(Name and address)*** via ***(e-mail)***.

If you have questions regarding your rights as a research participant, or if problems arise you are free to contact **Dr. Rashmi Kapoor, Principal Investigator,** Dayanand Medical College & Hospital, Ludhiana, India via email ; **rashmikapoor63@gmail.com**

CONSENT/PERMISSION

Name of participant:

DOB..... Age .....Sex.....

Address:

Contact No:

I confirm that I have read and understood the information sheet for this study. I confirm that the study objectives have been explained to me in detail and I have given ample time and opportunity to ask questions. I understand that my participation in the study is voluntary and that I am free to withdraw at any point of time, without giving any reason, without my medical care or legal rights being affected. I understand that my identity will not be revealed in any information released to third parties or published. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s). I consent voluntarily to participate as a participant in this research

I have received a copy of the information sheet and signed and dated inform consent form I agree to participate in the study on my own will:

Paticipant's/ LAR's Name **Signature.** **DD/MM/YYYY**

If LAR [then relation with patient]. _____

Signature of the person conducting the informed consent:

Name of Principal Investigator. **Signature.** **DD/MM/YYYY**

अध्ययन में भाग लेने के लिए सूचित सहमति पत्र

अध्ययन का शीर्षक

बच्चों में पुनर्जीवन तरल पदार्थ के रूप में सामान्य सलाइन के साथ एक संतुलित इलेक्ट्रोलाइट समाधान की तुलना

परिचय

खराब परिसंचरण के साथ बीमार बच्चों और कम रक्तचाप वाले बच्चे को स्थिर करने के लिए कुछ जीवन रक्षक तरल पदार्थ [अन्य उपायों के अलावा] की जरूरत होती है । सामान्य सलाइन [एनएस] और प्लाज्मा- लाइट [पी एल] दो ऐसे तरल पदार्थ हैं जो वर्तमान में दुनिया भर में उपयोग में हैं ।

यह अध्ययन क्यों किया जा रहा है?

एनएस और पीएल दोनों ही अपने फंक्शन में समान हैं [जो बीमार बच्चे में ब्लड प्रेशर और बीपी को सामान्य बनाना है] लेकिन उनकी ओवरऑल कंपोजिशन अलग हैं । हम तुलना करना चाहते हैं कि दो तरल पदार्थों के बीच कुछ मापदंडों के संबंध में प्रभावशीलता और सुरक्षा में अंतर है या नहीं।

अध्ययन कैसे किया जाएगा?

आपके बच्चे की उचित सहमति लेने के बाद विचाराधीन दो तरल पदार्थों में से एक प्राप्त होगा और कुछ प्रयोगशाला मापदंडों के संबंध में निगरानी की जाएगी जो नियमित रूप से उपचार के दौरान बच्चे की प्रगति की निगरानी के लिए किए जाते हैं ।

अध्ययन के अनुसार, रोगी को उपचार प्रदान करने की अवधि कितने समय की होगी

प्रवेश के समय तरल पदार्थ को एक बार प्रशासित किया जाएगा और फिर प्रवेश के पहले 3 दिनों के भीतर जरूरत पड़ने पर दिया जायेगा और रक्त परीक्षण के परिणाम एक संरचित प्रोफार्मा पर नोट किए जाएंगे।

अध्ययन के लाभ?

अध्ययन दो तरल पदार्थों के बीच प्रभावशीलता और सुरक्षा के मामले में मतभेदों के बारे में वैज्ञानिक ज्ञान की वृद्धि में योगदान देगा

शामिल जोखिम/अध्ययन कब बंद कर दिया जाएगा?

इस तरह के रूप में दोनों तरल पदार्थ सुरक्षित हैं, वर्तमान में दुनिया भर में उपयोग में है और इसलिए, अध्ययन में भागीदारी पर रोगी के लिए कोई जोखिम लागू नहीं करता है। अध्ययन तरल पदार्थ से किसी भी तरह का जोखिम नहीं है जिस की वजह से अध्ययन छोड़ना पड़े।

किसी भी नुकसान के मामले में भुगतान किया गया मुआवजा

अध्ययन रोगी के लिए कोई नुकसान या खतरा पैदा नहीं करता है क्योंकि अध्ययन में इस्तेमाल किए जाने वाले तरल पदार्थ वर्तमान में उपयोग में हैं और इस स्थिति के लिए लाभ पर जोखिम का कोई सबूत नहीं है जहां उनका उपयोग किया जा रहा है ।

डेटा की गोपनीयता

यह बीमाकृत किया जाता है कि बच्चे की पहचान और अन्य डेटा/उपचार विवरण और विवरण किसी अन्य व्यक्ति/प्राधिकरण के साथ साझा नहीं किए जाएंगे । अध्ययन में भागीदारी स्वैच्छिक है और बच्चे/ कानूनी रूप से स्वीकृत प्रतिनिधि कभी भी अध्ययन छोड़ सकते है।

स्वैच्छिक भागीदारी

इस शोध अध्ययन में भाग लेना स्वैच्छिक है। हम आपसे आग्रह करते हैं कि आप अपने जांचकर्ताओं के साथ इस अध्ययन के बारे में किसी भी प्रश्न पर चर्चा करें । इससे पहले कि आप भाग लेने का फैसला करें, कृपया

उतना ही समय लें जितना आपको किसी भी प्रश्न को पूछने और किसी के साथ या परिवार, दोस्तों या अपने व्यक्तिगत चिकित्सक या अन्य स्वास्थ्य पेशेवर के साथ इस अध्ययन पर चर्चा करने की आवश्यकता है। यदि आप भाग लेने के लिए चुनते हैं, तो आप किसी भी समय निर्णय वापस लेने का अधिकार रखते है । यदि आप भाग नहीं लेने का फैसला करते हैं या यदि आप बाद की तारीख में अनुसंधान में भाग लेने से रोकने का निर्णय लेते हैं, तो कोई दंड या लाभ की हानि नहीं होगी जिसके लिए आप अन्यथा हकदार हैं।

प्रश्नों या चिंताओं के लिए संपर्क जानकारी

आपको इस शोध के बारे में कोई भी सवाल पूछने का अधिकार है । यदि आपके पास प्रश्न, शिकायत या चिंताएं हैं, तो (ई-मेल) के माध्यम से प्रमुख अन्वेषक से संपर्क करें। यदि आपके पास एक शोध भागीदार के रूप में अपने अधिकारों के बारे में प्रश्न हैं, या यदि समस्याएँ आती हैं, तो आप **डॉ रश्मि कपूर, प्रिंसिपल इन्वेसिंगेटर, दयानंद मेडिकल कॉलेज एंड हॉस्पिटल, लुधियाना, इंडिया, ईमेल;rashmikapoor63@gmail.com** से संपर्क करने के लिए स्वतंत्र हैं ।

सहमति/अनुमति

प्रतिभागी का नाम:

जन्म तिथि: उम्र: लिंग:

पता:

संपर्क:

मैं इस बात की पुष्टि करता/ करती हूं कि मैंने इस अध्ययन के लिए सूचना पत्र पढ़ा और समझा है । मैं इस बात की पुष्टि करता/ करती हूं कि अध्ययन के उद्देश्यों को मुझे विस्तार से समझाया गया है और मैंने प्रश्न पूछने के लिए पर्याप्त समय और अवसर दिया है । मैं समझता/ समझती हूं कि अध्ययन में मेरी भागीदारी स्वैच्छिक है और मैं किसी भी समय, बिना कोई कारण बताए, बिना मेरी चिकित्सा देखभाल या कानूनी अधिकारों को प्रभावित किए जाने के लिए स्वतंत्र हूं । मैं समझता/ समझती हूं कि मेरी पहचान तीसरे पक्ष को जारी किसी भी सूचना में या प्रकाशित नहीं की जाएगी। मैं इस अध्ययन से उत्पन्न होने वाले किसी भी डेटा या परिणामों के उपयोग को प्रतिबंधित नहीं करने के लिए सहमत हूं बशर्ते कि ऐसा उपयोग केवल वैज्ञानिक उद्देश्य (ओं) के लिए हो । मैं स्वेच्छा से इस शोध अध्ययन में एक भागीदार के रूप में भाग लेने के लिए सहमत हूं। मुझे सूचना पत्र की एक हस्ताक्षरित और दिनांकित प्रति प्राप्त हुई है और मैं अपनी इच्छा से अध्ययन में भाग लेने के लिए सहमत सहमति पत्र पर हस्ताक्षर करता/ करती हूं

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पतिपंत/कानूनी रूप से स्वीकार किया गया प्रतिनिधि का नाम हस्ताक्षर दिनाक

यदि कानूनी रूप से स्वीकार किया गया प्रतिनिधि तो रोगी के साथ संबंध

_____

सूचित सहमति का संचालन करने वाले व्यक्ति के हस्ताक्षर:

_____ _____ _____

प्रधान अन्वेषक का नाम हस्ताक्षर दिनाक

ਅਧਿਐਨ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਸਹਿਮਤੀ ਫਾਰਮ

ਅਧਿਐਨ ਦਾ ਸਿਰਲੇਖ

ਸਧਾਰਣ ਸੈਲਾਇਨ ਦੇ ਨਾਲ ਇੱਕ ਸੰਤੁਲਿਤ ਇਲੈਕਟ੍ਰੋਲਾਈਟ ਦੀ ਬੱਚਿਆਂ ਵਿੱਚ ਰਿਜ਼ਿਸੀਟੇਸ਼ਨ ਫਲਿ ਵਜੋਂ ਤੁਲਨਾ

ਜਾਣ-ਪਛਾਣ

ਮਾੜੇ ਗੇੜ ਵਾਲੇ ਬੁੱਚਿਆਂ ਅਤੇ ਘੱਟ ਬਲੱਡ ਪ੍ਰੈਸ਼ਰ ਵਾਲੇ ਬੱਚੇ ਨੂੰ ਸਥਿਰ ਕਰਨ ਲਈ [ਹੋਰ ਉਪਾਵਾਂ ਤੋਂ ਇਲਾਵਾ] ਕੁਝ ਜਾਨ ਬਚਾਉਣ ਵਾਲੇ ਤਰਲਾਂ ਦੀ ਜ਼ਰੂਰਤ ਹੁੰਦੀ ਹੈ I ਸਧਾਰਣ ਖਾਰਾ [ਐਨਐਸ] ਅਤੇ ਪਲਾਜ਼ਮਾ-ਲੇਟ [ਪੀ ਐਲ] ਦੋ ਅਜਿਹੇ ਤਰਲ ਪਦਾਰਥ ਹਨ ਜੋ ਇਸ ਸਮੇਂ ਪੂਰੀ ਦੁਨੀਆ ਵਿੱਚ ਵਰਤੋਂ ਵਿੱਚ ਹਨ I

ਇਹ ਅਧਿਐਨ ਕਿਉਂ ਕੀਤਾ ਜਾ ਰਿਹਾ ਹੈ?

ਦੋਵੇਂ ਐਨਐਸਐਲ ਅਤੇ ਪੀਐਲ ਆਪਣੇ ਕਾਰਜਾਂ ਵਿਚ ਇਕੋ ਜਿਹੇ ਹਨ [ਜੋ ਕਿ ਕਿਸੇ ਬੀਮਾਰ ਬੱਚੇ ਵਿਚ ਬਲੱਡ ਪ੍ਰੈਸ਼ਰ ਅਤੇ ਬੀਪੀ ਨੂੰ ਸਧਾਰਣ ਕਰਨਾ ਹੈ] ਪਰ ਉਨ੍ਹਾਂ ਦੀ ਸਮੁੱਚੀ ਰਚਨਾ ਵੱਖਰੀ ਹੈ I ਅਸੀਂ ਤੁਲਨਾ ਕਰਨਾ ਚਾਹੁੰਦੇ ਹਾਂ ਜੇ ਦੋਵਾਂ ਤਰਲਾਂ ਦੇ ਵਿਚਕਾਰ ਕੁਝ ਮਾਪਦੰਡਾਂ ਦੇ ਸੰਬੰਧ ਵਿੱਚ ਪ੍ਰਭਾਵ ਅਤੇ ਸੁਰੱਖਿਆ ਵਿੱਚ ਕੋਈ ਅੰਤਰ ਹੈ ਜਾਂ ਨਹੀਂ I

ਅਧਿਐਨ ਕਿਵੇਂ ਕੀਤਾ ਜਾਵੇਗਾ?

ਤੁਹਾਡੇ ਬੱਚੇ ਨੂੰ ਉਚਿਤ ਸਹਿਮਤੀ ਲੈਣ ਤੋਂ ਬਾਅਦ ਵਿਚਾਰ ਅਧੀਨ ਦੇ ਤਰਲਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਾਪਤ ਹੋਏਗਾ ਅਤੇ ਕੁਝ ਪ੍ਰਯੋਗਸ਼ਾਲਾ ਦੇ ਮਾਪਦੰਡਾਂ ਦੇ ਸੰਬੰਧ ਵਿਚ ਨਿਗਰਾਨੀ ਕੀਤੀ ਜਾਏਗੀ ਜੋ ਇਲਾਜ ਦੇ ਦੌਰਾਨ ਬੱਚੇ ਦੀ ਪ੍ਰਗਤੀ ਦੀ ਨਿਗਰਾਨੀ ਲਈ ਨਿਯਮਤ ਤੌਰ ਤੇ ਕੀਤੀ ਜਾਂਦੀ ਹੈ I

ਅਧਿਐਨ ਦੇ ਅਨੁਸਾਰ, ਅਧਿਐਨ ਦੇ ਅਨੁਸਾਰ?

ਦਾਖਲਾ ਹੋਣ 'ਤੇ ਇਕ ਵਾਰ ਤਰਲ ਪਦਾਰਥ ਦਿੱਤਾ ਜਾਵੇਗਾ ਅਤੇ ਫਿਰ ਜੇ ਦਾਖਲੇ ਦੇ ਪਹਿਲੇ 3 ਦਿਨਾਂ ਦੇ ਅੰਦਰ ਅੰਦਰ ਜੇ ਲੋੜ ਪਵੇਗੀ ਅਤੇ ਖੂਨ ਦੀਆਂ ਜਾਂਚਾਂ ਦੇ ਨਤੀਜੇ ਇੱਕ ਪ੍ਰੋਫਾਰਮਾ' ਤੇ ਨੋਟ ਕੀਤੇ ਜਾਣਗੇ I

ਅਧਿਐਨ ਦੇ ਲਾਭ?

ਅਧਿਐਨ ਦੋਵਾਂ ਤਰਲਾਂ ਦੇ ਵਿਚਕਾਰ ਪ੍ਰਭਾਵ ਅਤੇ ਸੁਰੱਖਿਆ ਦੇ ਮਾਮਲੇ ਵਿੱਚ ਅੰਤਰ ਦੇ ਸੰਬੰਧ ਵਿੱਚ ਵਿਗਿਆਨਕ ਗਿਆਨ ਦੇ ਵਾਧੇ ਵਿੱਚ ਯੋਗਦਾਨ ਪਾਏਗਾ I

ਜੋਖਮ ਸ਼ਾਮਲ/ ਜਦੋਂ ਅਧਿਐਨ ਤੋਂ ਇਨਕਾਰ ਕੀਤਾ ਜਾਵੇਗਾ?

ਜਿਵੇਂ ਕਿ ਦੋਵੇਂ ਤਰਲ ਪਦਾਰਥ ਸੁਰੱਖਿਅਤ ਹਨ, ਵਰਤਮਾਨ ਵਿੱਚ ਪੂਰੀ ਦੁਨੀਆ ਵਿੱਚ ਵਰਤੋਂ ਵਿੱਚ ਹਨ ਅਤੇ ਇਸ ਤਰ੍ਹਾਂ, ਅਧਿਐਨ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਤੇ ਮਰੀਜ਼ ਨੂੰ ਕੋਈ ਜੋਖਮ ਨਹੀਂ I ਅਧਿਐਨ ਤਰਲ ਪਦਾਰਥਾਂ ਵਿਚ ਕੋਈ ਅਨੁਮਾਨਤ ਜੋਖਮ ਨਹੀਂ ਜੋ ਅਧਿਐਨ ਨੂੰ ਬੰਦ ਕਰਨ ਦੀ ਗਰੰਟੀ ਦਿੰਦਾ ਹੈ I

ਕਿਸੇ ਵੀ ਨੁਕਸਾਨ ਦੇ ਕੇਸ ਵਿਚ ਮੁਆਵਜ਼ਾ ਭੁਗਤਾਨ

ਅਧਿਐਨ ਨਾਲ ਮਰੀਜ਼ ਨੂੰ ਕੋਈ ਨੁਕਸਾਨ ਜਾਂ ਖਤਰਾ ਨਹੀਂ ਕਿਉਂਕਿ ਅਧਿਐਨ ਵਿਚ ਵਰਤੇ ਜਾਂਦੇ ਤਰਲ ਇਸ ਸਮੇਂ ਇਸਤੇਮਾਲ ਕੀਤੇ ਜਾ ਰਹੇ ਹਨ ਅਤੇ ਇਸ ਸਥਿਤੀ ਵਿਚ ਲਾਭ ਲਈ ਜ਼ਿਆਦਾ ਜੋਖਮ ਹੋਣ ਦਾ ਕੋਈ ਪ੍ਰਮਾਣ ਨਹੀਂ ਹੈI

ਡਾਟੇ ਦੀ ਗੁਪਤਤਾ

ਇਹ ਭਰੋਸਾ ਦਿੱਤਾ ਜਾਂਦਾ ਹੈ ਕਿ ਬੱਚੇ ਦੀ ਪਛਾਣ ਅਤੇ ਹੋਰ ਡੇਟਾ / ਇਲਾਜ ਦੇ ਵੇਰਵੇ ਕਿਸੇ ਹੋਰ ਵਿਅਕਤੀ / ਅਥਾਰਟੀ ਨਾਲ ਸਾਂਝੇ ਨਹੀਂ ਕੀਤੇ ਜਾਣਗੇ. I ਅਧਿਐਨ ਵਿਚ ਹਿੱਸਾ ਲੈਣਾ ਸਵੈਇੱਛੁਕ ਹੈ ਅਤੇ ਬੱਚਾ / ਕਾਨੂੰਨੀ ਤੌਰ ਤੇ ਸਵੀਕਾਰਿਆ ਨੁਮਾਇੰਦਾ ਕਿਸੇ ਵੀ ਸਮੇਂ ਅਧਿਐਨ ਤੋਂ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹੈ I

ਵਲੰਟੀਰੀ ਭਾਗੀਦਾਰੀ

ਇਸ ਖੋਜ ਅਧਿਐਨ ਵਿਚ ਹਿੱਸਾ ਲੈਣਾ ਸਵੈਇੱਛੁਕ ਹੈ I ਅਸੀਂ ਤੁਹਾਨੂੰ ਸਾਡੇ ਖੋਜਕਾਰਾਂ ਨਾਲ ਇਸ ਅਧਿਐਨ ਬਾਰੇ ਕਿਸੇ ਵੀ ਪ੍ਰਸ਼ਨ ਬਾਰੇ ਵਿਚਾਰ ਕਰਨ ਦੀ ਤਾਕੀਦ ਕਰਦੇ ਹਾਂ I ਇਸ ਤੋਂ ਪਹਿਲਾਂ ਕਿ ਤੁਸੀਂ ਹਿੱਸਾ ਲੈਣ ਦਾ ਫੈਸਲਾ ਕਰੋ, ਜੇ ਤੁਹਾਨੂੰ ਕੋਈ ਪ੍ਰਸ਼ਨ ਪੁੱਛਣ ਦੀ ਜ਼ਰੂਰਤ ਹੈ ਤਾਂ ਜਿੰਨ੍ਹਾਂ ਚਾਹੇ ਸਮਾਂ ਲੈ ਸਕਦੇ ਹੋ ਅਤੇ ਇਸ ਅਧਿਐਨ ਬਾਰੇ ਕਿਸੇ ਵੀ ਵਿਅਕਤੀ ਜਾਂ ਪਰਿਵਾਰ, ਦੋਸਤਾਂ ਜਾਂ ਆਪਣੇ ਨਿੱਜੀ ਡਾਕਟਰ ਜਾਂ ਹੋਰ ਸਿਹਤ ਪੇਸ਼ੇਵਰ ਨਾਲ ਵਿਚਾਰ ਕਰ ਸਕਦੇ ਹੋ I

ਪ੍ਰਸ਼ਨਾਂ ਜਾਂ ਵਿਚਾਰਾਂ ਲਈ ਸੰਪਰਕ ਕਰੋ

ਇਸ ਖੋਜ ਬਾਰੇ ਕੋਈ ਵੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛਣ ਦਾ ਤੁਹਾਨੂੰ ਅਧਿਕਾਰ ਹੈ I ਜੇ ਤੁਹਾਡੇ ਕੋਈ ਪ੍ਰਸ਼ਨ, ਸ਼ਿਕਾਇਤਾਂ ਜਾਂ ਚਿੰਤਾਵਾਂ ਹਨ, ਤਾਂ (ਈ-ਮੇਲ) ਦੁਆਰਾ ਪ੍ਰਿੰਸੀਪਲ ਇਨਵੈਸਟੀਗੇਟਰ (ਨਾਮ ਅਤੇ ਪਤਾ) ਨਾਲ ਸੰਪਰਕ ਕਰੋ I

ਜੇ ਤੁਹਾਡੇ ਕੋਲ ਖੋਜ ਭਾਗੀਦਾਰ ਹੋਣ ਦੇ ਨਾਤੇ ਤੁਹਾਡੇ ਅਧਿਕਾਰਾਂ ਬਾਰੇ ਕੋਈ ਪ੍ਰਸ਼ਨ ਹਨ, ਜਾਂ ਜੇ ਸਮੱਸਿਆਵਾਂ ਪੈਦਾ ਹੁੰਦੀਆਂ ਹਨ ਤਾਂ ਤੁਸੀਂ **ਡਾ. ਰਸ਼ਮੀ ਕਪੂਰ**, ਪ੍ਰਮੁੱਖ ਜਾਂਚਕਰਤਾ ਨਾਲ ਸੰਪਰਕ ਕਰਨ ਲਈ ਸੁਤੰਤਰ ਹੋ, ਦਯਾਨੰਦ ਮੈਡੀਕਲ ਕਾਲਜ ਅਤੇ ਹਸਪਤਾਲੰ, ਲੁਧਿਆਣਾ, ਭਾਰਤ , ਈਮੇਲ ਰਾਹੀਂ; rashmikapoor63@gmail.com

ਕੰਸੈਂਟ / ਪਰਮੀਸ਼ਨ

ਭਾਗੀਦਾਰ ਦਾ ਨਾਮ:

ਜਨਮ ਮਿਤੀ: ਉਮਰ:

ਲਿੰਗ:

ਪਤਾ:

ਸੰਪਰਕ ਨੰ:

ਮੈਂ ਪੁਸ਼ਟੀ ਕਰਦਾ/ ਕਰਦੀ ਹਾਂ ਕਿ ਮੈਂ ਇਸ ਅਧਿਐਨ ਲਈ ਜਾਣਕਾਰੀ ਸ਼ੀਟ ਨੂੰ ਪੜ੍ਹ ਅਤੇ ਸਮਝ ਲਿਆ ਹੈ I ਮੈਂ ਇਸ ਗੱਲ ਦੀ ਪੁਸ਼ਟੀ ਕਰਦਾ/ ਕਰਦੀ ਹਾਂ ਕਿ ਅਧਿਐਨ ਦੇ ਉਦੇਸ਼ਾਂ ਬਾਰੇ ਮੈਨੂੰ ਵਿਸਥਾਰ ਨਾਲ ਸਮਝਾਇਆ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂੰ ਪ੍ਰਸ਼ਨ ਪੁੱਛਣ ਲਈ ਕਾਫ਼ੀ ਸਮਾਂ ਅਤੇ ਮੌਕਾ ਦਿੱਤਾ ਗਿਆ ਹੈ I ਮੈਂ ਸਮਝਦਾ / ਸਮਝਦੀ ਹਾਂ ਕਿ ਅਧਿਐਨ ਵਿਚ ਮੇਰੀ ਭਾਗੀਦਾਰੀ ਸਵੈ-ਇੱਛੁਕ ਹੈ ਅਤੇ ਮੈਂ ਬਿਨਾਂ ਕਿਸੇ ਕਾਰਨ ਦੇ, ਮੇਰੀ ਡਾਕਟਰੀ ਦੇਖਭਾਲ ਜਾਂ ਕਾਨੂੰਨੀ ਅਧਿਕਾਰਾਂ ਦੇ ਪ੍ਰਭਾਵਿਤ ਕੀਤੇ ਬਗੈਰ ਕਿਸੇ ਵੀ ਸਮੇਂ ਵਾਪਸ ਲੈਣ ਲਈ ਸੁਤੰਤਰ ਹਾਂ I ਮੈਂ ਸਮਝਦਾ / ਸਮਝਦੀ ਹਾਂ ਕਿ ਮੇਰੀ ਪਛਾਣ ਤੀਜੀ ਧਿਰ ਨੂੰ ਜਾਰੀ ਕੀਤੀ ਜਾਂ ਪ੍ਰਕਾਸ਼ਤ ਕੀਤੀ ਗਈ ਕਿਸੇ ਵੀ ਜਾਣਕਾਰੀ ਵਿੱਚ ਪ੍ਰਗਟ ਨਹੀਂ ਕੀਤੀ ਜਾਏਗੀ I ਮੈਂ ਇਸ ਅਧਿਐਨ ਤੋਂ ਪੈਦਾ ਹੋਏ ਕਿਸੇ ਵੀ ਡੇਟਾ ਜਾਂ ਨਤੀਜਿਆਂ ਦੀ ਵਰਤੋਂ 'ਤੇ ਰੋਕ ਲਗਾਉਣ ਲਈ ਸਹਿਮਤ ਨਹੀਂ ਹਾਂ ਬਸ਼ਰਤੇ ਅਜਿਹੀ ਵਰਤੋਂ ਸਿਰਫ ਵਿਗਿਆਨਕ ਉਦੇਸ਼ਾਂ ਲਈ ਹੋਵੇ I ਮੈਂ ਇਸ ਖੋਜ ਵਿੱਚ ਭਾਗੀਦਾਰ ਬਣਨ ਲਈ ਸਵੈ-ਇੱਛਾ ਨਾਲ ਸਹਿਮਤ ਹਾਂ I

ਮੈਨੂੰ ਜਾਣਕਾਰੀ ਸ਼ੀਟ ਦੀ ਹਸਤਾਖਰ ਅਤੇ ਮਿਤੀ ਵਾਲੀ ਇਕ ਕਾਪੀ ਮਿਲੀ ਹੈ ਅਤੇ ਸੂਚਿਤ ਸਹਿਮਤੀ ਫਾਰਮ ਤੇ ਮੈਂ ਆਪਣੀ ਇੱਛਾ ਅਨੁਸਾਰ ਅਧਿਐਨ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਸਹਿਮਤ ਹਾਂ:

_____	_____	_____
ਅਧਿਐਨ ਭਾਗੀਦਾਰ/ ਕਨੂੰਨੀ ਤੌਰ ਤੇ ਸਵੀਕਾਰੇ ਪ੍ਰਤਿਨਿੱਧੀ ਦਾ ਨਾਮ	ਦਸਤਖਤ	ਮਿਤੀ

ਜੇਕਰ ਕਨੂੰਨੀ ਤੌਰ ਤੇ ਸਵੀਕਾਰੇ ਪ੍ਰਤਿਨਿੱਧੀ [ਫਿਰ ਮਰੀਜ਼ ਨਾਲ ਸਬੰਧ] _____

ਸੂਚਿਤ ਸਹਿਮਤੀ ਲੈ ਰਹੇ ਵਿਅਕਤੀ ਦੇ ਦਸਤਖਤ:

_____	_____	_____
ਪ੍ਰਮੁੱਖ ਜਾਂਚਕਰਤਾ ਦਾ ਨਾਮ	ਦਸਤਖਤ	ਮਿਤੀ